A STUDY TO ASSESS THE EFFECTIVENESS OF TOPICAL APPLICATION OF AMLA JUICE ON WOUND HEALING AMONG CLIENTS WITH DIABETIC FOOT ULCER ADMITTED AT SELECTED HOSPITAL, TIRUVANNAMALAI

DISSERTATION SUBMITTED TO

THE TAMIL NADU DR.M.G.R.MEDICAL UNIVERSITY

CHENNAI

IN PARTIAL FULFILMENT OF REQUIREMENT FOR THE DEGREE OF

MASTER OF SCIENCE IN NURSING

APRIL 2015

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LIST OF ABBREVIATIONS

DFU	-	Diabetic Foot Ulcer
DM	-	Diabetes Mellitus
F	-	Frequency
FBG	-	Fasting Blood Glucose
IDF	-	International Diabetes Federation
ICMR	-	Indian Council Of Medical Research
IFG	-	Impaired Fasting Glucose
IGT	-	Impaired Glucose Tolerance
MD	-	Mean Difference
NS	-	Not Significant
NHSL	-	National Hospital of Sri Lanka
PG	-	Post Graduate
PN	-	Peripheral Neuropathy
PVD	-	Peripheral Vascular Disease
S	-	Significance
SD	-	Stranded Deviation
UG	-	Under Graduate
UN	-	United Nations
UCTH	-	University of Caliber Teaching Hospital
WHO	-	World Health Organization
%	-	Percentage

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ABSTRACT

A study to assess the effectiveness of Topical application of Amla juice on Wound healing among Clients with Diabetic foot ulcer admitted at Selected Hospital, Tiruvannamalai.

INTRODUCTION

India is the diabetic capital of the world with its largest share of diabetic persons

According to International Diabetes Federation (2014) 387 million people in the world have diabetes mellitus and in India 62 million people are affected. Indian Council of Medical research ICMR (2014) Stated that 4.8 Million people have Diabetes Mellitus in Tamil Nadu. This large number of diabetes places an enormous economic burden on the health care system due to increase in the development of complications.

Diabetes mellitus is recognized to be common in Indians of Asian subcontinent. According to Vijay Viswanathan,et.,al (2010) 25 million Indians have diabetes mellitus. This projection indicate that India will have the largest number of population Diabetes mellitus by the year 2025 A.D. If left untreated, diabetes can cause many complication. Serious long–term complication include Cardiovascular Disease, Stroke, Kidney Failure, Foot ulcers and damage to the eyes.

The loss of a limb or foot is one of the most feared complications of diabetes and foot problems remain the commonest reason for diabetic patients to be hospitalized. Diabetic foot ulcer is a major complication of Diabetes Mellitus, It occurs in 15% of all patients with Diabetes mellitus which result in 84% of all diabetes-related lower-leg amputations.

Emblica officinalis (Amla) is proven to have benefits that Speeden up wound healing process and it contains antioxidant and high content of Vitamin C which help in enhancing wound healing. It is safe and cost effective intervention with no side effects and improves the wound healing among clients with diabetic foot ulcer.

OBJECTIVE

To assess the effectiveness of Topical application of Amla juice on Wound healing among Clients with Diabetic foot ulcer.

RESEARCH DESIGN

A True experimental pre and post test design was used.

SETTING

The study is conducted in Medical and Surgical Unit in TNK Hospital, Tiruvannamalai.

SAMPLING TECHNIQUE

Simple random sampling technique was used to select the 60 clients with Diabetic foot ulcer 30 were assigned to experimental group and 30 to control group.

PARTICIPANTS

60 clients with Diabetic foot ulcer who fulfill the inclusive criteria.

INTERVENTION

It refers to application of 10-15ml of amla juice –impregnated gauze applied on wound for 7 days (once in a day) in experimental group. Hospital routine measures were followed for the control group.

MEASUREMENTS AND TOOL

Degree of diabetic foot ulcer was assessed by using modified Bates-Jensen Wound Assessment Tool in Experimental and control group for diabetic foot ulcer.

RESULTS

In comparison of the pre test and post test degree of wound healing among clients with Diabetic foot ulcer in experimental group, revealed that the calculated paired 't' value t= 7.591 was found to be statistically significant at $p<0.001$ level. This clearly indicates that the topical application of Amla juice on diabetic wound had shown a significant improvement in the post test degree of wound healing among clients with diabetic foot ulcer in the experimental group.

In comparison of post test degree of wound healing among clients with diabetic foot ulcer between the experimental and control group revealed that the calculated unpaired 't' value t= 5.380 was found to be statistically significant at $p<0.001$which indicates that there was difference in the post test degree of wound healing between the groups, this clearly shows that topical application of diabetic foot ulcer had improvement the degree of wound healing in experimental group.

CONCLUSION

Amla juice Application administered to the clients in experimental group had significant improvement in their post test degree of wound healing than the clients in the control group who had received routine hospital treatment. Hence Amla juice application can be used as a safe and effective alternative therapy for clients with Diabetic foot ulcer.

IMPLICATIONS FOR CLINICAL PRACTICE

There is significant improvement in the degree of wound healing among the clients with Diabetic foot ulcer after the topical application of Amla juice dressing. This study suggests that the nurses play pivotal role in providing to topical application of Amla juice for foot ulcer among Diabetic clients. Further researches have suggested to determine the effectiveness of Amla juice application as a regular non pharmacological measure for clients with Diabetic foot ulcer of varying degree and also related studies could be conducted to assess the knowledge and practice on topical application of Amla juice among the care givers of clients with Diabetic foot ulcer.

CHAPTER – 1

INTRODUCTION

''Every 30 seconds a lower limb is lost somewhere
in thence world as a consequence of diabetes ''.
(International diabetes Federation)

1.1 BACKGROUND OF THE STUDY

Diabetes mellitus is a group of metabolic disorder characterized by elevated levels of glucose in the blood (hyperglycemia) resulting from defects in insulin secretion, insulin action or both. Diabetes is an ice berg disease.

According to International Diabetes Federation (2014) 387 million people in the world have diabetes mellitus and in India 62 million people are affected. Indian Council of Medical research ICMR (2014) stated that 4.8 Million people have Diabetes Mellitus in Tamil Nadu. This large number of Diabetes places an enormous economic burden on the health care system due to increase in the development of complications.

The main underlying causes of the Diabetes Mellitus are genetic and environmental factors such as urbanization and industrialization, as well as increased longevity and changes in lifestyle from a traditional healthy and active life to a modern, sedentary, stressful life and over-consumption of energy dense foods. The prevalence of diabetes mellitus varies among populations due to differences in genetic susceptibility and social risk factors such as change in diet, obesity, physical inactivity and possible factors relating to intrauterine development.

Diabetes mellitus needs to be treated by using a holistic approach through dietary adjustment, exercise, medication, education and self-care measures. Type I and II diabetes mellitus is preventable metabolic disorder. These need to focus on health promoting activities to raise awareness among healthy people to reduce the risk factors for diabetes mellitus. Diabetes is one of the most deadly, disabling, and costly disease faced by Nation at this time and the disease continues to be on the rise at epidemic

proportions. The Global prevalence of diabetes is set to double over the next 25 years. Developing countries like India, already top of the diabetes league, are expected to shoulder much of this burden.

Diabetic foot ulcer is a major complication of diabetes mellitus and probably the major component of the diabetic foot. It occurs in 15% of all patients with diabetes and precedes 84% of all diabetes-related lower-leg amputations. There are two main reasons for the foot complication. Some diabetic patients develop a diabetic peripheral neuropathy characterized by loss of sensation in the feet. Such patients have a high risk of injuries which often go unnoticed. Diabetic clients particularly those with neuropathy have abnormal pressure points under the feet. In these area, the skin gets thickened (called callus) which then becomes an ulcer. Chronic infection in the ulcer ultimately leads to amputation of a toe or the whole foot. These two groups of patients are considered to have “High Risk Feet”

The Treatment of Diabetic foot ulcer includes debridement with removal of all necrotic tissue and oral antibiotics with removal of necrotic or poorly vascular red tissue, including infected bone - Revascularization if necessary. The ulcer care includes frequent wound debridement, frequent wound inspection and use of absorbent, non-adhesive, non-occlusive dressings.

Amla is a deciduous tree that grows up to 20 to 30 feet high. Its botanical name is Phyllanthus emblica or Emblica officinalis. The tree is usually found in India and Nepal and this is referred to as Indian or Nepalese gooseberry.

The word ″Amla″ is derived from the Sanskrit word "Amlaki″. The tree is best known for its round, small and green fruit. The fruit has a sour and bitter taste. Except for the seed, all parts of the Amla fruit are edible. A major ingredient in most Ayurvedic products, Amla is a potent fruit known for promoting health and longevity.

Amla (Emblica officinalis) pure and natural juice is said to have great rejuvenating and antioxidant property. It is considered to be one of the richest source of natural vitamin C. The fruit is also rich in proteins and fibers. It contains minerals such as iron, calcium, and phosphorus besides vitamins A and B, Gallic acid, Tannins and

.pectin. The rich vitamin C content of this fruit makes it one of the strongest immune boosters available to mankind. This means that regular Application or intake of Amla will prevent from all kinds of bacterial, viral and fungal infections.

Its cooling properties make it ideal for treating all kinds of skin disorders and chronic ulcer. Its strong antioxidant properties have a protective effect on heart, lungs, brain, and skin, infected wounds. The rich antioxidant properties of Amla make it a wonderful fruit for the wound healing. It prevents the cells from free radical damage.

Sumitra M, Manikandan .P et al., (2005) conducted a study to assess the effectiveness of emblica on wound healing. The study findings revealed that topical application of Emblica offcinalis (Amla) reports a feasible approach to enhance delayed wound healing.

Cooper RA, Molan PC (2013) Stated that the topical application of amla on wound act as a deodorant, an effect attributed to the presence of Amla which is an inexpensive moist dressing with antioxidant, vitamin C and tissue-healing properties that is very effective in healing of diabetic foot ulcer healing.

1.2 NEED FOR THE STUDY

Patients with Diabetic Foot Ulcer (DFU) have a greater all-cause death risk as compared with patients with Diabetes without a history of DFU. According to Study published in 'Diabetologia', 3619 events of all cause mortality, states an additional 58 deaths per 1,000 each year among patients with Diabetic foot ulcer in India.

Foot problems commonly develop in people with diabetes and can quickly become serious. With damage to the nervous system, a person with diabetes may not be able to feel his or her feet properly. Normal sweat secretion and oil production that lubricates the skin of the foot is impaired. These factors together can lead to abnormal pressure on the skin, bones, and joints of the foot during walking and can lead to breakdown of the skin of the foot. Sores may develop. Damage to blood vessels and impairment of the immune system from diabetes makes it difficult to heal these wounds.

Dr Srujal Shah (2013), Stated that, Diabetic foot ulcers are sores or wounds on the foot and are often a strong indicator of advanced Diabetes. Most commonly, these wounds occur on the bottom of the foot under pressure points (such as the ball of the foot) and on the toes.

Up to 25% of patients with diabetes develop a foot ulcer. More than half of all foot ulcers become infected, requiring hospitalization and 20% of infections result in amputation. Diabetes contributes approximately 80% of all non-traumatic amputations performed every year. After a major amputation, 50% of people will have another limb amputated in two years. People with a history of a diabetic foot ulcer have a 40% greater 10-year death rate than people with diabetes alone. Diabetic foot ulcers double the death rate and heart attack risk while increasing risk for stroke by 40.

Diabetic foot ulcer when developed pose an increased developed, risk of wound progression that may ultimately lead to amputation; Diabetic ulceration has been shown to precede amputation in up to 85% of cases. At least 40% of amputations in diabetic patients can be prevented with a team approach to wound care.

Devender Singh (2010) stated that first amputation is a poor prognostic sign in diabetic patients and 28% to 51% of these patients require a second amputation within 5 years. The 5-year mortality rate after lower extremity amputation ranges from 39% to 68%. The vast majority of diabetic foot complication resulting in amputation begins with the formation of skin ulcer.

The wound site in diabetic foot ulcer is rich in oxidants such as Hydrogen peroxide, mostly contributed by neutrophils and macrophages. Amla (emblica officinalis) Contains Ascorbic acid, emblicanin A (2,3-di-O-galloyl-4,6-(S)-hexahydroxydiphenoyl-2-keto-glucono-delta-lactone) and emblicanin B (2,3,4,6-bis-(S)-hexahydroxydiphenoyl-2-keto-glucono-delta-lactone) that exhibit a very strong antioxidant action. These antioxidants when added to the wound microenvironment would support the repair of tissue process. Topical application of emblica accelerated Diabetic wound contraction and closure. Emblica increases cellular proliferation and cross-linking of collagen at the wound site as evidenced by an increase in the extracellular activity. Amla juice application promotes antioxidant activity at the wound

healing. Amla juice dressing acts as an alternative therapy on wound healing among client with Diabetic foot ulcer.

Farah et al., (2009) conducted a study to assess the positive effects of Amla dressing on wound healing. The study concluded that there was significant reduction after the treatment with Amla dressing at $p<0.05$ level.

Wound dressing using Amla juice in Clients with Diabetic foot ulcer reduces the wound size and depth, promote and speedup the wound healing process which lead to decrease in treatment period and thereby reduce the hospital stay.

During the time of clinical exposure as a staff nurse investigator found that there was a high prevalence rate of diabetic foot ulcer among client with diabetes mellitus. There is an increasing demand from clients with DFU to speedup wound healing process and reduce the economic burden of hospitalization with use of safe , cost effective alternative therapy. This motivated the investigator to conduct a study to assess the effectiveness of Topical application of Amla juice on wound healing among clients with diabetic foot ulcer.

1.3 STATEMENT OF THE PROBLEM

A study to assess the effectiveness of topical application of Amla juice on Wound healing among Clients with Diabetic foot ulcer admitted at selected Hospital, Tiruvannamalai.

1.4 OBJECTIVE OF THE STUDY

1. To assess the Pre test degree of wound healing among clients with Diabetic foot ulcer in Experimental and control group.
2. To assess the post test degree of wound healing among clients with Diabetic foot ulcer in Experimental and control group.
3. To compare the pre and post test degree of wound healing among clients with Diabetic foot ulcer in Experimental group.
4. To compare the pre and post test degree of wound healing among clients with Diabetic foot ulcer in Control group.

5. To compare the pre test degree of wound healing among clients with Diabetic foot ulcer between Experimental and Control group.
6. To compare the post test degree of wound healing among clients with Diabetic foot ulcer between the Experimental and Control group.
7. To determine the association in the pre and post test mean difference degree of wound healing with selected demographic variables in Experimental group.
8. To determine the association in the pre and post test mean difference degree of wound healing with selected demographic variables in Control group.

1.5 OPERATIONAL DEFINITIONS

Effectiveness

It refers to change in degree of wound healing after the application of Amla juice impregnated gauze dressing which was measured by using modified Bates Jensen Wound assessment tool.

Topical Application of Amla Juice

In this study, Topical application of Amla juice refers to application of 10-15ml of Amla juice impregnated gauze over the wound by sterile dressing once daily for 7 consecutive days.

Wound Healing

Wound healing refers to filling of wound with regenerative tissue and measured in terms of modified Bates-Jensen wound assessment tool.

Clients

Clients with Diabetic foot ulcer admitted in T.N.K Hospital for its management.

Diabetic Foot Ulcer

Diabetic foot ulcers is slow healing wounds classified as mild and moderate wound according to modified Bates- Jensen wound assessment tool and that occur in the bottom of foot in the clients with Diabetes mellitus.

1.6 ASSUMPTIONS

1. Clients with Diabetic foot ulcer may have delayed wound healing.
2. Amla juice application may enhance wound healing for clients with Diabetic foot ulcer.

1.7 NULL HYPOTHESES

NH_1: There is no significant difference between the pre and post test degree of wound healing among clients with Diabetic foot ulcer in experimental group at $p<0.05$.

NH_2: There is no significant difference between the pre and post test degree of wound healing among clients with Diabetic foot ulcer in control group at $p<0.05$.

NH_3: There is no significant difference in the post test degree of wound healing among clients with Diabetic foot ulcer between experimental and control group at $p<0.05$.

NH_4: There is no significant association in the pre test and post mean difference degree of wound healing among clients with Diabetic foot ulcer with selected demographic variables in experimental group at $p<0.05$.

NH_5: There is no significant association in the pre and post test mean difference degree of wound healing among clients with Diabetic foot ulcer with selected demographic variables in control group at $p<0.05$.

1.8 DELIMITATIONS

1. The study is delimited to a period of 4 weeks only.
2. The study is conducted in selected setting only.

1.9 CONCEPTUAL FRAMEWORK

Conceptual frame work based on ORLANDO'S THEORY OF DELIBERATIVE NURSING PROCESS MODEL**.**

Conceptual frame work is a device that helps to stimulate researcher and extension of knowledge by providing both direction and impetus **(Polit & Hungler, 1999).**

Orlando's deliberate nursing process model was selected for this present study, This theory is used by a nurse to meet patient need for help, meeting this need and reduce the patients behavior. The components are,

- Patient behavior
- Nurse reaction
- Nurse activity

Conceptual framework serves as a guide (or) map to systematically identify a logical, precisely defined relationship between variables. The conceptual work based on Orlando's theory of the nursing process is used for the present study. The researcher compared the effectiveness of Topical application Amla juice on Diabetic foot ulcer patients.

1) Patient behavior:

According to theory patients behavior means, patients feel helpless and the person's behaviors reflect his feeling. It can be verbal or non verbal which is (expressed by language such as complaints, requests, demands (or) refusals) non verbal manifested physiologically such as heart rate edema or motor or vocally such as crying)

In the present study patient behavior is expressed by verbal and non verbal diabetic foot ulcer, symptoms, such as.

- → Pain
- → Skin redness and irritation
- → Burning sensation

2) Nurse reaction:

According to theory nurse reaction to a patients behavior forms the basis for determining how a nurse acts .In this present study, the Nurse reacts by assessing the degree of wound healing by using modified Bates –Jensen Wound assessment among clients with Diabetic foot ulcer in experimental and control group.

3) Nurse Activity:

According to theory nurse activity can be deliberative

Deliberative action:

It means exploring the meaning and relevance of an action to the patient, these actions are evaluated for effectiveness immediately after completion.

In this present study, Nurse Activity is topical application of Amla juice on wound among clients with Diabetic foot ulcer, in experimental group. Amla juice (10 – 15ml) applied once in a day as sterile dressing among clients with Diabetic foot ulcer in the experimental group for 7 consecutive days. In the control group the hospital routine was followed.

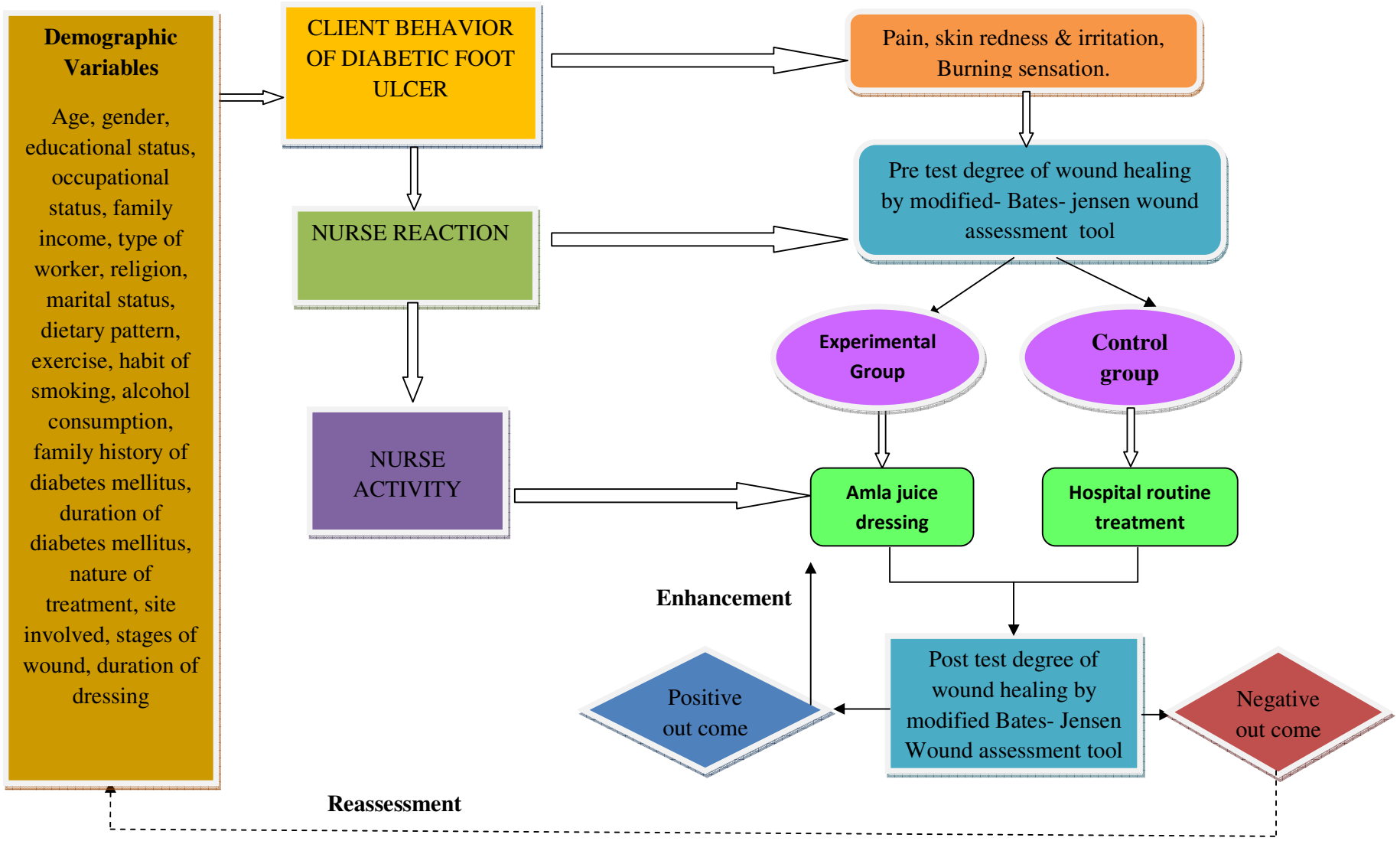

FIG.1: CONCEPTUAL FRAMEWORK BASED ON ORLANDO'S THEORY OF DELIBERATIVE NURSING PROCESS

OUTLINE OF THE REPORT

The report is divided into 6 chapters

Chapter I – Deals with backgrounds of the study, need for the study, statement of the problem, objectives, operational definitions, assumptions, research hypotheses, delimitation of the study and conceptual framework.

Chapter II – contains a review of related literature pertaining to various areas of study.

Chapter III – Deals with the research methodology of the study.

Chapter IV – Presents the analysis and interpretation of data.

Chapter V – Deals with discussion based on the findings of the study.

Chapter VI – Contains summary, conclusions, nursing implications, limitations and recommendations of the study.

This is followed by Bibliography and relevant appendices.

CHAPTER – 2

REVIEW OF LITERATURE

The review of literature refers to an extensive, exhaustive and systematic examination of publications, scholarly print materials, relevant to the research project. Qualitative research is typically conducted within the context of previous knowledge. A through literature review provides a foundation on which to base new knowledge and usually conducted well before any data is collected in qualitative studies. A familiarization with previous studies can also be useful in suggesting research topics or in identifying aspects of a problem about which more research is needed.

Literature review was done for the present study and presented under the following headings:

Section A: Reviews related to Diabetes mellitus.
Section B: Reviews related to Diabetic foot ulcers.
Section C: Reviews related to complications of Diabetic foot ulcer.
Section D: Reviews related to Amla juice application on Diabetic foot ulcer

Section A: Reviews related to diabetes mellitus

Dahiru T, Jibo A, Hassan AA, Mande, et al., (2012) conducted a cross sectional study to assess the Prevalence of diabetes in a semi-urban community in Northern Nigeria.199 subjects were selected Three subjects had fasting blood glucose (FBG) of more than 160 mg/dL one participant a previously known diabetes on medication had a good glycaemic control. The overall prevalence of diabetes was 2.0%.Five participants (2.5%) had impaired fasting glucose (IFG). Among the diabetics, one was overweight (BMI = 27.43 Kg/m2) and one was obese (BMI = 31.55 Kg/m2), while among those with impaired fasting glucose two were overweight. Forty-three subjects (21.6%) were overweight and 15 (7.5%) were obese. study conclude that the prevalence of diabetes mellitus in this semi-urban community is keeping with been reported earlier from across the country.

Shaini.G, Latha Venkatesan, Anita Ben (2012) conducted a study on effectiveness of Structured Teaching on Home Care Management of Diabetes Mellitus. Equal percentage of participants (50%) from both sex were selected. Most of the subjects were graduates. The family history of diabetes was present in 34% of the subjects. Heredity plays a very important role in the development of diabetes mellitus. This study finding revealed that 90% had a family history of diabetes mellitus out of which, 34% of subjects had acquired it genetically from their father. The investigator found that 40% were well aware of knowledge about diabetes mellitus and its management.

Shah Shekhar Kumar, Saikia M et al., (2011) conducted a Cross sectional study to assess the prevalence of glucose tolerance with urban Population in North Eastern India. In a total of 1016 randomly selected adults aged 20 years (595 men, 421 women) glucose tolerance was tested. The age adjusted prevalence of Type 2 diabetes was 8.2% in total, 8.7% in men, 7.8% in women. The age adjusted prevalence of IGT was 4% in total, 4.1% in men and 3.8% in women. In the multiple regression analysis, age, family history, increasing socio-economic status and decreasing physical activity were significantly associated with Type 2 diabetes. Sex and BMI were not contributory. In the Impaired Glucose Tolerance [IGT] group, the results were similar to Type 2 diabetes but BMI was also a contributory factor. This study stated that the prevalence of Type 2 diabetes in urban areas of Assam was also high, as reported from urban population in southern India.

Manouk Bos and **Charles Agyema (2011)** conducted a systematic review on the Prevalence and complications of diabetes mellitus in Northern Africa. Literature searches were conducted using electronic databases. The study results suggests that Diabetes prevalence ranged from 2.6% in rural Sudan to 20.0% in urban Egypt. Diabetes prevalence was significantly higher in urban areas than in rural areas. Undiagnosed diabetes is common in Northern Africa with a prevalence ranging from 18% to 75%. The prevalence of chronic diabetes complications ranged from 8.1% to 41.5% for retinopathy, 21% to 22% for albuminuria, 6.7% to 46.3% for nephropathy and 21.9% to 60% for neuropathy. The study finding suggests that diabetes is an important and common health problem in Northern Africa. Variations in prevalence of diabetes between individual countries are observed. Chronic complications of diabetes are

common. Urgent measures are needed to prevent diabetes and its related complications in Northern Africa.

Goldfracht (2010) conducted a retrospective cohort study to assess the effectiveness of primary care providers to monitor and control glycemic level of diabetic patients at Beersheva Israel A Total of 876 physicians participated in the study. Samples were selected randomly from the clinics and patients were selected from register entries. The data analysis was carried out by descriptive statistics. The study results revealed that the glycemic control improved especially within the group with highly uncontrolled diabetes. The implication of this study was that the effective care by primary health care providers resulted in improvement of glycemic level in patients with diabetes.

Dharamvir Ranjan and BharatiRanabir (2009) conducted a cross sectional study on Prevalence and determinants of diabetes mellitus in Puducherry**,** Simple random sampling technique was used for the selection of 1370 adult 20 years of age and above. Main outcome measures were the assessment of the prevalence of prevalence and correlates of diabetes among the adult population. Predesigned and pretested questionnaire was used to elicit the information on family and individual sociodemographic variables. Height, weight, waist, and hip circumference, blood pressure was measured and venous blood was also collected to measure fasting blood glucose, blood cholesterol. The study results revealed that overall, 8.47% study subjects were diagnosed as diabetic. The univariate analysis and multivariate logistic regression analysis showed that the important correlates of diabetes mellitus were age, blood cholesterol, and family history of diabetes. The findings were found to be statistically significant. The study finding concludes that adults having increased age, hypercholesterolemia, and family history of diabetes mellitus are more likely to develop diabetes mellitus.

Mc Daniel G (2009) conducted a true experimental study to assess the effectiveness of post teaching telephone follow up on patients self care behaviors and knowledge. 31 elderly patients with diabetes mellitus were randomly assigned to experimental and control groups. Subjects in the experimental group were contacted by telephone within 28-48 hour after discharge from the hospital. The calls were repeated at weekly intervals for 3 weeks. Each phone call consisted of assessing the subject's self

care knowledge and practice in self care activities or behaviors. Supplemental instructions were provided when indicated. Subjects in the control group did not receive a phone call after discharge from the hospital. Diabetic self care knowledge and self care behavior were assessed in both groups and the result indicated that the experimental group had higher scores in knowledge and self care behavior than control group.

Dorothy A. Rhoades, Yvette Roubideaux et al., (2008) conducted cross sectional study to assess the prevalence of, and quality of care for, diabetes mellitus among older urban American Indians. Total population selected was 1000. The study findings stated that most patients with diabetes were treated with either insulin (43%) or oral hypoglycemic medication (39%), but 16% received neither. Although 65% of patients had ever been referred to a dietitian, only 40% had received exercise counseling. The total number of health problems was the factor most often associated with quality of care indicators.

Pradeepa R et al. (2010) conducted a cohort study to determine the prevalence of, and risk factors, diabetic neuropathy (DN) in south Indian type 2 diabetic subjects. A total of 1629 diabetics subjects were included, of whom 1291 were known to have diabetes (KD) subjects and 338 were randomly selected newly detected diabetics (NOD) subjects. Neuropathy was diagnosed if vibratory perception threshold at the great toe, measured by biothesiometry, exceed mean +2 SD of a healthy non-diabetic study population aged 20-45 years. The overall prevalence of DN was 26.1 %(aged-adjusted 13.1%) with no significant difference in gender. The prevalence of neuropathy was significantly higher in KD subjects compared with NDD subjects (27.8 Vs 19.5%, P= 0.002). The prevalence of diabetic retinopathy (24.1Vs 15.3%, P=0.0001) and hypertension (51.1 Vs 40.0% P, <0.0001) were higher in those with neuropathy compared with those without. The odds ratio for neuropathy in subjects with duration of diabetes >15 years compared with =5 years was 5.7 (95% confidence interval: 3.52-9.08, P<0.0001) Regression analysis showed age (P<0.0001), glycated hemoglobin (P=0.001) and duration of diabetics (P=0.045) to be significantly.

Bergen(2011) conducted a survey to determine the proportion of people with diabetic mellitus reporting all inhabitants aged 20 years and older residing in a large geographic region were invited to participate in the Nord-Trøndelag Health Study, 71% (n=65,604) attended. Those reporting diabetes (n=1,972) were invited to take part in an ancillary study on diabetes. Based on 1,494 responses to the question: ``Have you had a foot ulcer that required more than three weeks to heal'', the proportion with a history of foot ulcer was estimated. The overall proportion with a history of foot ulcer was 10.4% (95%). In the final multivariate logistic regression model, significant factors for a foot ulcer history included age ≥75 years 95% height (men>17 cm, women>161cm) (1.9, 95% , gender (male) (1.5, 95% using insulin and macro vascular complications (95%). The proportion of people reporting a history of foot ulcer in this population-based study exceeded the proportion of foot ulcer history reported previously. Height as a correlate has been occasionally reported in previous studies and needs further attention. Associated factors for a foot ulcer history help identify individuals who may be at particular risk of this adverse outcome.

Section B: Reviews related to Diabetic foot ulcers

Kifle Woldemichael Deribe et al., (2014) conducted a cross sectional study to assess the prevalence and Factors Influencing Diabetic Foot Ulcer among Diabetic Patients Attending Arbaminch Hospital, South Ethiopia.216 diabetic clients were admitted in the hospital, Subjects were identified using simple random sampling and data was collected by four trained diploma level nurses using interviewer administered questioner, record review check list and observation check lists. The data was coded and entered to Epidata version 3.1 and exported to SPSS version 16.0 for analysis. Descriptive analysis was done for sociodemographic variables, diabetic knowledge, diabetes self care practice and attitude and clinical factors. Binary logistic regression analysis was also done to identify independent factors associated with diabetic foot ulcer and significant factors was declared at $p<0.05$ .The study concludes that there was a Significant proportion of patients with diabetes developed diabetic foot ulcer. Rural residence; presence of co-morbidity; duration of diabetes, mean arterial blood pressure and occupationare factors associated with diabetic foot ulcer.

Chian Mou Lee, et al., (2013) conducted a retrospective study to explore the causes of foot ulceration and practice foot self-care behaviors before and after diabetic foot ulceration, in a rural hospital, southern Taiwan. A total of 49 participants with diabetic foot ulcers participated in this study, more than half were male (63.3%), still working in farming or fishing (61.2%). all participants were suffering from peripheral neuropathy (100%) and 71.5% showed claudication. nearly two thirds reported not having received diabetic foot care education and 82% not having received regular vasculopathy assessment before the wound appeared. The results suggest that the common reasons for foot ulcers were unnoticed trauma and neglect of foot self-care. The study findings suggests that most diabetic foot ulcers are preventable, since they result from a high prevalence of peripheral neuropathy, inadequate provision of vasculopathy assessment and inappropriate management of foot self-care.

Kumarasinghe A. Sriyani, et al., (2013) conducted a cross sectional study Predictors of Diabetic Foot and Leg Ulcers in a Developing Country with a Rapid Increase in the Prevalence of Diabetes Mellitus 88 subjects with leg and foot ulcers and 80 non ulcer controls. Socio demographic data and life style factors were documented. Foot was examined for skin changes and structural abnormalities. Distal peripheral neuropathy was assessed by pressure sense, vibration sense and joint position sense. Multivariate analysis by logistic regression was used to determine the significant predictors in screening for foot ulcers Education of grade 6 and below 95% , low income (95%), impaired vibration sense (95%), abnormal monofilament test on first , 95% CI; 1.36 - 16.6), third (, 95% and fifth (95%) toes are found to be predictors of increased risk whereas incidental diagnosis of DM wearing covered shoes (95%), presence of normal skin color (95%) and normal monofilament test on first metatarsal head 0.10, 95%) are protective factors for ulcers. The study concludes that there was a Ten independent risk and protective factors identified in this study are proposed as a simple screening tool to predict the risk of developing leg and foot ulcers in patients with DM.

Manisha C. Gholap (2013) conducted a descriptive study to correlate the knowledge and practice of diabetic patients with selected demographic variables regarding foot care in Krishna Hospital, Karad. The total population was 150 study findings on level of knowledge score of diabetic patients regarding foot care reveals that majority 29(58%) had average knowledge, 12(24%) had good knowledge and 9(18%)

had poor knowledge. The level of practice score of diabetic patients regarding foot care reveals that majority 29(58%) had average practice, 11(22%) had good practice and 10(20%) had poor practice. The study results revealed that there was a perfect correlation between knowledge and practice regarding foot care among diabetic patients which means there is increase in knowledge with increase in practice of the patients.

Shailesh K. Shahi (2013) conducted a to prospectively Prevalence of Diabetic Foot Ulcer and Associated Risk Factors in Diabetic Patients From North India. where 678 diabetic patients were examined, of which 97 reported diabetic foot ulcers (DFUs). Patients were interviewed using a pre-tested structured questionnaire to document clinical history. Statistical analysis was performed using SPSS 16.0 software. The findings reveals Prevalence of DFUs among diabetic patients was 14.30% (95%). Of 581 patients suffering from diabetes alone, 42.16% (95%) belonged to rural areas whereas among the cases with DFUs (n 97), 70.10% belonged to rural areas. In a multivariate logistic regression model, important risk factors for DFUs included age >50 years (P = 0.00), duration of diabetes 4 to 8 years 2.47) and > 8 years 3.03,, rural location (OR = 0.44, P = 0.00), oral hypoglycemic treatment (= 2.90,), insulin treatment (9.58, , and tobacco use (0.57, P = 0.00). A study concluded that there was a high prevalence of foot ulcers was confirmed among North Indian rural diabetic patients.

Christoph (2012) conducted a survey approach study to find out the incidence of amputations and their relative risks in diabetes patients and the study reports were compared to the non-diabetic population. The samples were selected from hospitals of approximately 160, 000 inhabitants. The study results indicated that the incidence of amputations was 33.8% in diabetic population and 9.4% in non-diabetic population. The study findings suggests that improving foot care in diabetic individuals appears to be the main reason for the reduction of amputation rate from 90% to 46%.

Sheelian (2012) conducted a quasi experimental study to assess the effect of health teaching on prevention of diabetic foot ulcers among patients in selected diabetic health centers, sample of 100 was utilized for the study .Health teaching on prevention of diabetic foot ulcer was given as intervention for the samples. The study results showed that increased level of knowledge on prevention of Diabetic Foot Ulcers slowed down the ulcer rate among diabetic patients.

Aidan Searle, (2011) conducted a Qualitative Approach to Understanding the Experience of Ulceration and Healing in the clients with Diabetic Foot ulcer. To address this gap in knowledge, 2 qualitative studies were undertaken. In the first study, interviews were conducted with 13 patients with diabetic foot ulcers recruited from outpatient podiatry clinics. A second study was conducted with podiatrists working in the outpatient clinics from which the patients were recruited. In both studies, the interview schedules consisted of a series of open-ended questions concerned with examining beliefs about ulcers, causes and treatment of ulcers, and adherence to treatment recommendations. All interviews were tape recorded, transcribed, and coded for emerging themes using the "constant comparison" approach to qualitative data analysis. The experience of having ulcers had a considerable impact on patients' lifestyles. Both ulcer and treatment affected the patient's mobility, independence, and social life. These experiences often lead to anger, fear, depression, helplessness, boredom, and loss of self-esteem. Podiatrists also perceived that foot ulcers had a negative impact on patients' lives and their emotional well-being and were aware of factors that may influence adherence to treatment. The study concluded that understanding and addressing the physical and psychosocial aspects of foot ulceration may improve clinical outcomes.

Chamil Vidusha Madushan Jinadasa (2011) conducted a descriptive cross sectional study to determine the knowledge and practice of foot care in patients with chronic diabetic foot ulcer patients, from National Hospital of Sri Lanka (NHSL). 110 Diabetic foot ulcers patients were selected and they were given a pre tested questionnaire following informed consent. Patient perceptions of foot care were inquired. A scoring system ranging from 0-10 was employed to analyze the responses given for level of knowledge and practice of diabetic foot care. The study results revealed that, mean age was 58.4 years and 57.3% were males and Non healing ulcers were present among 82.7% and amputat**ions** amounted to 38.2%. The control of diabetes was poor in 60%. Regarding foot care knowledge, the mean score was 8.37. 75.5% had scored above mean and 52.7% were aware of all principles of foot care. Regarding foot care practices, the mean score was 4.55 and 47.3% participants had scored below mean and 22.7% did not practice any foot care principle and hence scored 0. A Statistically significant difference exists between the foot care knowledge and practice scores ($p<0.001$). In the study sample 51% were not educated prior to occurrence of complications. The study

concludes that Implementation of a national policy on diabetic foot management and good patient follow-up to increase compliance would help to improve this situation.

Akaninyene Asuquo Otu, et al.,(2013) Conducted a retrospective study to assess the profile, bacteriology, and risk factors for foot ulcers in patients with DM in the University of Calabar Teaching Hospital (UCTH), Nigeria. A total of 3,882 patients were admitted unto the medical wards (male and female) of UCTH during the period under review. Of this number, 297 (7%) were admitted on account of DM complications with 166 (55.9%) being males and 131 (44.1%) being females. Out of these 297 patients, foot ulcers accounted for 63 (21.2%) admissions. The study concluded that there prevalence of foot ulcers among diabetics presenting to UCTH is high. This is more common among the older age group (>70 years of age). DMFU causes prolonged hospitalization in the course of treatment. Staphylococcus aureus, coliforms, and Pseudomonas are common infective agents. Quinolones are useful in therapy. Risk factors for DMFU include peripheral neuropathy, peripheral vascular disease, and walking barefoot. This study has identified the burden and profile of DMFU among diabetics presenting to UCTH, Nigeria, and highlighted the magnitude of the problem. An effective diabetes foot programme is required to address the identified risk factors for DMFU and reverse the current trend.

Ilona Statius Muller, (2013) Conducted a study to determine the incidence of foot ulceration and lower limb amputation in type 2 diabetic patients in primary health care. Population of type 2 diabetic patients increased from 511 patient. The annual incidence of foot ulceration varied between 1.2 and 3.0% (mean 2.1) per year; 25% of the patients had recurrent episodes. The annual incidence of lower limb amputation varied between 0.5 and 0.8% (mean 0.6). Ten of the 15 amputees died, and 12 of 52 (23%) patients with ulceration had a subsequent amputation or a previous history of amputation. In 35 of the 73 (48%) episodes of ulceration, only the family physician provided treatment. Patients with foot problems were older and had more cardiovascular disease, retinopathy, and absent peripheral pulses. Study concluded that the incidence of foot ulceration and lower limb amputation in type 2 diabetes is low; nevertheless, recurrence rates of ulceration and risk of amputation are high, with high mortality.

Johannes AN Dorresteijn, et.al.,(2014) Conducted a Prospective randomised controlled trials (RCTs) To assess the effects of patient education on the prevention of foot ulcers in patients with diabetes mellitus. Of the 12 RCTs included, the effect of patient education on primary end points was reported in only five. Pooling of outcome data was precluded by marked, mainly clinical, heterogeneity. One of the RCTs showed reduced incidence of foot ulceration (risk ratio (RR) 0.31, 95% confidence interval (CI) 0.14 to 0.66) and amputation (RR 0.33, 95%) during one-year follow-up of diabetes patients at high risk of foot ulceration after a one-hour group education session. However, one similar study, with lower risk of bias, did not confirm this finding (RR amputation 0.98, 95% RR ulceration 1.00, 95%). Three other studies, also did not demonstrate any effect of education on the primary end points, but were most likely underpowered. Patients' foot care knowledge was improved in the short term in five of eight RCTs in which this outcome was assessed, as was patients' self-reported self-care behavior in the short term in seven of nine RCTs. Callus, nail problems and fungal infections improved in only one of five RCTs. Only one of the included RCTs was at low risk of bias. Study concluded that there education alone is effective in achieving clinically relevant reductions in ulcer and amputation incidence.

OC Oguejiofor, CU Odenigbo, AC Odike(2005) conducted Clinical methods for assessing the diabetes foot at risk of ulceration Diagnosis of these risk factors depends on the presence of typical symptoms and signs but these may be subjective and mislead at times, as significant sounding symptoms may not indicated presence of genuine PN or PVD, while many asymptomatic patients may possess genuine PN or PVD. Objective methods of diagnosis of these risk factors are currently available. Bio Thesiometry and aesthesiometry screen for presence of PN and are rapid, reliable and reproducible methods of objectively diagnosing PN. The hand–held Doppler ultrasound device is currently the gold standard for non-invasive and rapid assessment of the adequacy of peripheral circulation through the determination of the Ankle. The study conclude that highly subjective nature of the symptoms and signs of the factors for foot ulceration in DM patient merits augmentation of diagnosis with these objective and more reliable methods of diagnosis to facilitate early intervention in those with these risk factor

Section C: Reviews related to complications of Diabetic foot ulcer

Bo Kyung Koo, Chang-Hoon Lee,Bo Ram (2014) Conducted cross sectional study to assess the Incidence and Prevalence of Diabetes Mellitus and Related Atherosclerotic Complications in Korea. The prevalence of T2DM in Korean adults aged 20–89 years was 6.1–6.9% and the annual incidence rates of T2DM ranged from 9.5–9.8/1,000 person-year (PY) during the study period. The incidence rates of T2DM in men and women aged 20–49 years showed decreasing patterns from 2009 to 2011 (P<0.001); by contrast, the incidence in subjects aged 70–79 years showed increased patterns from 2009 to 2011 (P<0.001). The incidence rates of CAD and CVD in patients newly diagnosed with T2DM were 18.84/1,000 PY and 11.32/1,000 PY, respectively, in the year of diagnosis. Among newly diagnosed individuals with T2DM who were undergoing treatment for PAD, 14.6% underwent angioplasty for CAD during the same period. The study concluded that our study measured the national incidences of T2DM, CAD, CVD, and PAD, which are of great concern for public health. We also confirmed the relatively higher risk of CAD and CVD newly detected T2DM patients compared to the general population in Korea.

Satyavani Kumpatla, (2013) conducted study to assess the direct costs of treating long-term diabetic complications among hospitalized subjects with type 2 diabetes. A total of 368 (M: F, 254:114) hospitalized patients were divided into groups based on the presence of complications and were compared with a group without any complications (Group1; n=86), Group2; n=67 with chronic kidney disease, Group3; n=53 with cardiovascular complications, Group4; n=58 who underwent foot amputation, Group5; n=66 with retinal complications and Group6; n=38 with presence of two complications. Details on socio-demography, hospitalization, direct costs of all inpatient care were recorded. The data on expenditure was obtained from hospital bills. The patients with foot complications or with presence of two diabetic complications tend to stay long for every inpatient admission. On an average, patients with foot complications (19020 INR) and those who had two complications (17633 INR) spent four times more and patients with renal disease (12690 INR),cardiovascular (13135 INR) and retinal complications (13922 INR) spent three times more than patients without any complications (4493 INR). The median expenditure for hospital admissions for the previous two years was higher for patients with foot and cardiovascular complications and it was highest if they had presence of two complications. Study concluded that there

present study highlights the direct cost estimates and economic burden of treating severe long term diabetic complications.

Fatma Al-Maskari[*] and **Mohammed El-Sadig (2012)** conducted a general cross-sectional survey carried out to assess the prevalence of DM complications in Al-Ain district, UAE. A sample of 513 diabetic patients with a mean age of 53 years were randomly selected All completed an interviewer-administered questionnaire and underwent medical assessment including foot examination and assessment of presence of peripheral neuropathy (PN) and peripheral vascular disease (PVD) Forty nine percent of the study populations were diagnosed to have DM without presenting with symptoms of diabetes and 35% had hypertension. The majority (86%) had type 2 DM. Of the total sample, 39% (7%) had PN and 12% (95%) had PVD. There were no cases of amputation and only one case had previous history of lower extremity ulceration. Significant risk factors for PN and PVD were: male gender, poor level of education, UAE nationality, increased duration of diabetes, type 2 DM, presence of hypertension and microalbuminuria (MA). Study concluded that despite the low prevalence of foot ulceration and amputation among the study population, nevertheless, a substantial proportion had potential risk factors for foot complications.

Vijay Viswanathan (2011) conducted a Multicentric study to assess the Pattern and Causes of Amputation in Diabetic Patients in India. A total of 1985 (M:F 1249:736) type 2 diabetic subjects were selected from 31 centres across India. Out of 1985 subjects, a total of 1295 patients who had undergone amputations both major and minor were included in this analysis. The major cause for the occurrence of amputations among the patients was found to hence infection. Almost 90% of the patients had infection. Patients had different types of amputations: major amputations accounting for 29.1% (n=377) and minor amputations in 70.9% (n= 918) of subjects. Among the subjects who underwent major amputations, more than 50% accounts for below knee amputations and 11.9% above knee amputations. Out of total amputations, over half of the incident amputations were of toes. Presence of claw toes was seen in 64% of patients. Prevalence of neuropathy (82%) was high and 35% had peripheral vascular disease. The study findings stated the infection was found to be the major cause of amputation in India. Below knee, toes amputation were the most common type of amputation. Diabetic patients should be educated on foot care and importance of proper foot wear.

Lisa H. Williams, MD, MS, A Carolyn(2010) conducted a Prospective cohort study to assess the depression is associated with an increased risk of incident diabetic foot ulcers among 4839 patients with diabetes. The present analysis included 3474 adults with type 2 diabetes and no prior diabetic foot ulcers or amputations. Mean follow-up was 4.1 years. Major and minor depression assessed by the Patient Health Questionnaire-9 was the exposures of interest. The outcome of interest was incident diabetic foot ulcers. We computed the hazard ratio and 95% confidence interval (CI) for incident diabetic foot ulcers, comparing patients with major and minor depression with those without depression and adjusting for socio demographic characteristics, medical co morbidity, glycosylated hemoglobin, diabetes duration, insulin use, number of diabetes complications, body mass index, smoking status, and foot self-care. Sensitivity analyses also adjusted for peripheral neuropathy and peripheral arterial disease as defined by diagnosis codes. Compared with patients without depression, patients with major depression by Patient HealthQuestionnaire-9 had a 2-fold increase in the risk of incident diabetic foot ulcers (95%). There was no statistically significant association between minor depression study conclude that there Major depression by Patient Health Questionnaire-9 is associated with a 2-fold higher risk of incident diabetic foot ulcers.

Mohammad Reza, Mohajeri Tehrani , (2010) A conducted descriptive study to assess the cause of lower limb amputation. Total population873 patients Mean age was 59.3□±□11.2 years and most of the patients developed DFU in 5th and 6th decades of their life. 58.1% were men. 28.8% had family history of DM. Mean duration of DM was 172.2 months. Mean duration of DFU was 79.8 days. Only 14.4% of the patients had Hemoglobin A1C□<□7%. 69.6% of the patients had history of previous hospitalization due to DM complications. The most prevalent co-morbidities were renal, cardiovascular and ophthalmic ones. Most patients had ischemic DFU" and DFU in their "right" limb. The most prevalent location of DFU was patients' toes, with most of them being in the big toe. 28.2% of the patients underwent lower-limb amputations. The amputation rate in the hospital where the multidisciplinary approach has been used was lower (23.7% vs. 30.1%).The study conclude that. DFU is most likely to develop in middle-aged diabetic patients with a long duration of DM and poor blood sugar control who have other co-morbidities of DM. Male patients are at more risk. Recurrence of DFU is a major point of concern which underscores the importance of patient education to prevent secondary ulcers

Section D Reviews related to Amla juice application on Diabetic foot ulcer

Jull AB, Rodgers A and Walker N (2012), conducted a comparative study between acute and chronic diabetic wound to determine effect of amla on healing a acute wounds (burns, lacerations and other traumatic wounds) and chronic wounds (venous ulcers, arterial ulcers, diabetic ulcers, pressure ulcers, infected surgical wounds). 100 clients met the population. Randomized trials that evaluated amla as a treatment for any sort of acute or chronic wound were sought.. The results showed that 19 trials (n=2554) were identified that met the inclusion criteria. In acute wounds, three trials evaluated the effect of amla in acute lacerations, abrasions or minor surgical wounds and nine trials evaluated the effect the amla in burns. In chronic wounds two trials evaluated the effect of amla in venous leg ulcers and one trial in pressure ulcers, infected post-operative wounds, and Fournier's gangrene respectively. Two trials recruited people with mixed groups of chronic or acute wounds.. In acute wounds, amla may reduce time to healing compared with some conventional dressings. In chronic wounds, alma in addition to compression bandaging does significantly increase healing in venous leg ulcers. The study concluded that there was significant effect of Amla on mild to moderate wound healing treatment group and there was no significant changes found in conventional dressing group. Amla dressing acts as an adjuvant that significantly increases leg ulcer healing.

Visavadia BG (2012) conducted a study to assess the effectiveness of Manuka amla dressing on chronic wound infections patients. Total population of 150 villagers were included in the study. Two groups were involved in the study. The battle against wound infection is becoming more difficult in the community. The study results suggests that Manuka amla dressing has long been available as a non-antibiotic treatment in the management of chronic wound infections at $p < 0.001$ level.

A Shukrimi J. et al., (2012) conduced true experimental study to compare the effectiveness of Amla dressing on Diabetic foot ulcer among diabetes patient Amla dressing done for Wagner's grade-II diabetic foot ulcers with controlled dressing group (povidone iodine followed by normal saline). Surgical debridement and appropriate antibiotics were prescribed in all patients. There were 30 patients age between 31 to 65 years old (mean of 52.1 years). The mean healing time in the standard dressing group was 15.4 days (range 9 - 36 days) compared to 14.4 days (range 7-26 days) in the Amla

group ($p<0.005$). The study findings revealed that, ulcer healing was significantly in experimental group. Amla dressing is a safe alternative dressing for Wagner grade-II diabetic foot ulcers.

Mikhalchik et al., (2010) conducted a true experimental study to assess effectiveness of amla preparation from accelerated Diabetic wound healing and reduced the severity of local inflammation. Total sampling 60, randomized controlled trial group which patient received either a conventional wound dressing the effect of this phyto preparation can be related to an increase in the effectiveness of intracellular bacterial killing by tissue phagocytes due to the inhibition of bacterial catalase. The result findings showed that antioxidant activity of the preparation decreases the risk of oxidative damage to tissues.

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CHAPTER – 3

RESEARCH METHODOLOGY

This chapter describes the methodology adopted in this study to assess the effectiveness of topical application of Amla juice on wound healing among Clients with Diabetic foot ulcer at selected hospital, Tiruvannamalai.

This study includes Research Approach, Research Design, Variables, Setting, Population, Sample, and Sample Size, Sampling Technique, Criteria for Sample Selection, Development and Description of Tool, Scoring procedure, Content validity, Pilot study, Reliability, Data collection procedure and Plan for data analysis.

3.1 RESEARCH APPROACH

The research approach used in this study is a Quantitative research approach

3.2 RESEARCH DESIGN

Research design is the researchers over all plans for obtaining answers to hypothesis. **Polit (2008)**

The research design adopted for this study is pre test and post test design basic experimental design which comes under True experimental design.

GROUP (R)	**Pre-test**	**Intervention**	**Post-test**
EXPERIMENTAL (E)	RE_1	X	RE_2
CONTROL (C)	RC_1	-	RC_2

Schematic representation of true experimental design

Where,

RE 1- Pre test degree of wound healing in randomized Experimental group.

RE 2- Post test degree of wound healing in randomized Experimental group

X- Amla juice application on diabetic foot ulcer

RC 1- Pre test degree of wound healing in randomized Control group

RC2- Post test degree of wound healing in randomized Control group

In this study the pre assessment degree of wound healing of both experimental and control group were measured by using Modified Bates-Jensen Wound assessment tool followed by implementation of Amla juice application on Diabetic foot ulcer for 7 days for experimental group at the end of 7th day the post assessment degree of wound healing was assessed in experimental and control group the hospital routine was followed.

3.3 VARIABLES

Independent Variable

The independent variable for the study is Topical application of Amla juice.

Dependent Variable

The dependent variable for the study is degree of wound healing.

Extraneous Variable

Age, Gender, Religion, Educational status, Occupation status, Monthly income , Type of family, Type physical activity ,Dietary pattern, Habit of smoking, Alcohol consumption, Exercise, Family history of DM, Type of diabetes mellitus, Duration of treatment, Nature of treatment, Site Diabetic foot ulcer , Type of wound stage, Duration of diabetic foot ulcer and Duration of dressing for diabetic foot ulcer.

3.4 SETTING OF THE STUDY

The study was conducted in male and female medical and surgical unit in TNK Hospital at Tiruvannamalai. TNK Hospital is 220 bedded hospital with all the medical facility for clients admitted with Diabetes mellitus and its complication. The average admission for a month is 120 Diabetes clients with Diabetic foot ulcer.

3.5 POPULATION

The population comprises of patients with Diabetic foot ulcer admitted in male and female medical and surgical ward at the time of study in TNK Hospital at Tiruvannamalai.

Target Population

The target population for the study includes all the diabetic foot ulcer clients.

Accessible Population

Accessible population for this study was clients with Diabetic foot ulcer who is admitted at TNK Hospital, Tiruvannamalai available at the time of data collection.

3.6 SAMPLE

The study sample comprises of clients with Diabetic foot ulcer fulfill the inclusive criteria of the study.

3.7 CRITERIA FOR SAMPLE SELECTION

Inclusive Criteria

1. Clients who are willing to participate in the study
2. Clients who are between the age group 41 to70 years.
3. Clients with Diabetic foot ulcer exposed up to subcutaneous tissue and muscle
4. Clients with type I and type II diabetes mellitus.
5. Clients who were available during the period of data collection.
6. Clients who are able to communicate in Tamil or English.

Exclusive Criteria

1. Clients who are Allergic to Amla juice
2. Clients with Diabetic foot ulcer exposed up to bone and with gangrene formation
3. Client who has no sensation in the foot.

3.8 SAMPLE SIZE

A Sample Size is 60. 30 in experimental group and 30 in control group.

3.9 SAMPLING TECHNIQUE

Sample refers to a subjects of a population selected to participate in a research study. In this present study, the sample size consisted of 60 clients with Diabetic foot ulcer admitted in ward during the period of data collection.

In this study, simple random sampling technique by using lottery method is adopted to select the subjects who met the inclusive criteria. Simple random sampling procedure was employed to select the study participants. There were pieces of paper that were written as A and B, the word A was used to represent the experimental group, and B was used to represent the control group. Once the piece of paper was chosen, it was not included in the sample again and each participant was allowed to pick only once.

3.10 DEVELOPMENT AND DESCRIPTION OF TOOLS

An instrument in research refers to the tool or equipment used for data collection. It may take the form of observation check list, questionnaires, an interview schedule, a projective desire or some other type of tool for eliciting information. The investigator may use an instrument that has been developed or designed as an original tool or she may take parts of one or more instruments from which she develops a new one.

The tool used for the present study, was an interview / observational schedule. The blood pressure was measured using sphygmomanometer and stress was measured by perceived stress 13 item scale which is a standardized tool. The interview / observational schedule consist of two sections.

Section A:

This section consists of Demographic data such as Age, Gender, Religion, Educational status, Occupation status, Family income , Type of family, Type of work ,Dietary pattern, Type of diabetes mellitus, Habit of smoking, Alcohol consumption, Exercise, Family history of DM, Nature of treatment, Site involved area involved, Type of wound stage, Duration of diabetic foot ulcer and Duration of dressing.

Section B:

Modified Bates-Jensen Wound Assessment Tool for diabetic foot ulcer assessment tool to assess the pretest and post test degree of wound healing. The

assessment includes wound size, depth of wound, and edges, under- mining, presence of necrotic tissue, Exudates type, exudates amount, skin color surrounding wound, peripheral issue edema, peripheral tissue indurations, granulation tissue, epitheliazation.

Scoring Technique:

There is 13 items in the scale; the total score is 65.The higher the total scores the more severe the wound status.

S.NO.	DEGREE OF WOUND HEALING	SCORING
1	Tissue health	1-12
2	Wound regeneration	13-20
3	Mild wound regeneration	21-30
4	Moderate wound degeneration	31-40
5	Severe wound degeneration	41-65

3.11 CONTENT VALIDITY

Validity is the degree to which an instrument measures which is intended to measure. **Polit(2008)**

The content validity of the tool was established on the basis of opinion of two Medical experts, one Dietician, Six Nursing experts specialized in Medical Surgical Nursing. Based on the suggestions of the experts changes were made in the tool after consulting with the research guide.

3.12 ETHICAL CONSIDERATION

The ethical principles followed in the study were,

A. Beneficence

a) Freedom from harm and discomfort

Participants are not subjected to unnecessary risks for harm or discomfort during the study period.

b) Protection from exploitation

Participants are given need in information about provided will not be used against them in any way.

B. Respect for Human Dignity

The investigator followed the second ethical principle of respect for human dignity. It includes the right to determination and the right to self disclosure**.**

a) The Right to self determination

The investigator has given full freedom to the participants to decide voluntarily whether to participate in the study or to withdraw from the study and the right to ask questions.

b) The right to full disclosure

The researcher has fully described the nature of the study is usefulness in wound healing the person right to refuse participation.

After description of the study both oral and written informed consent is obtained from the participants.

C. Justice

The selection of study participants was completely based on research requirements.

A full privacy was maintained throughout the process of data collection.

After the study result is obtained the same treatment given to all the patients.

D. Confidentiality

The researcher maintained confidentiality of the data provided by the study participants.

The research and ethical committee has accepted the area of the study. Each individual client was informed about the purpose of the study and confidentiality was promised and ensured. Informed consent was obtained from each individual. The client had the freedom to leave the study at his or her will without assigning any reason. Thus the ethical issues were ensured in the study. Regular dressing practice in the hospital was continued.

3.13 PILOT STUDY

Pilot study is a small scale version or trial run designed to test the methods to be used in a larger group, more rigorous study which is sometimes referred to as the parent study. **(Polit, 2008).**

Pilot study is a trail for main study to test the reliability, appropriateness and feasibility of the study and the tool. The formal permission was obtained from principal of Vignesh Nursing College. The Investigator obtained permission from TNK Hospital at Tiruvannamalai .The study period was 1 week. The investigator selected 10 subjects by using simple random sampling technique method. 5 subjects were assigned to experimental group and 5 subjects assigned to control group.

The investigator explained about the aims, purpose, advantages of the study to the experimental group and control group. After obtaining the demographic details, pre assessment of wound is done by the modified Bates- Jansen Wound Assessments tool. Investigator has done sterile dressing using the topical Application of Amla Juice on wound in clients with Diabetic Foot ulcer for 7 days in Experimental group .Post test degree of wound healing was assess using the modified Bates-Jansen Wound Assessment tool in Experimental and Control group .There was a highly significant improvement in the degree of wound healing in Experimental group and there was no significant changes found in the Control group at $p<0.001$ level .The pilot study revealed that study was feasible.

3.14 RELIABILITY OF THE TOOL

Reliability is defined as the extent to which the instrument yields the same result on repeated measures. It is thus concerned with consistency, accuracy, stability, and homogeneity.

Reliability of the tool was tested by the investigator and another medical surgical nursing expert personnel who was trained in the use of tools .The reliability of the tool was determined by using inter-rater reliability method. The reliability score was $r = 0.96$ Hence the tool was considered highly reliable for proceeding with the study.

3.15 PROCEDURE FOR DATA COLLECTION

Data collection is the gathering of information needed to address the research problem. The word data means information that is systematically collected in the course of study.

This study was conducted at TNK Hospital, Tiruvannamalai. The data was collected for a period of 4 weeks in the month of May - Jun 2014. Prior permission from the authorities was sought. The objective purpose and risk of the study was explained and confidentiality was maintained. The investigator gave brief introduction and information about self and the purpose of the study to the subjects.

Investigator established rapport with the subjects and assured that no physical or emotional harm would be done in the course of the study.

The study subjects were selected by simple random sampling technique based on sample selection criteria. A total of 60 Diabetic foot ulcer clients recruited in the study for experimental and control group each group contains 30 samples. The subjects were made to sit comfortably in a bed well ventilated room and confidentiality regarding the data was assured. After obtaining their verbal and written informed consent for willingness to participate in the study, the investigator conducted the pretest to assess the pre assessment data were collected using interview/ observational method in the both group which took around 25-30 min.

In Experimental group was received Morning Hospital dressing on the day evening received Amla juice dressing It refers to application of 10-15ml of Amla juice – impregnated gauze applied on wound once a day for 7 consecutive days. Amla juice application was not given for the control group and they were requested to follow Hospital routine. Post test was conducted for the experimental and control groups on the 7^{th} day after intervention. During post test observed degree of wound healing to assess the modified Bates-Jensen Wound Assessment tool.

3.16 PLAN FOR DATA ANALYSIS

Date was analyzed by using both descriptive and inferential statistics.

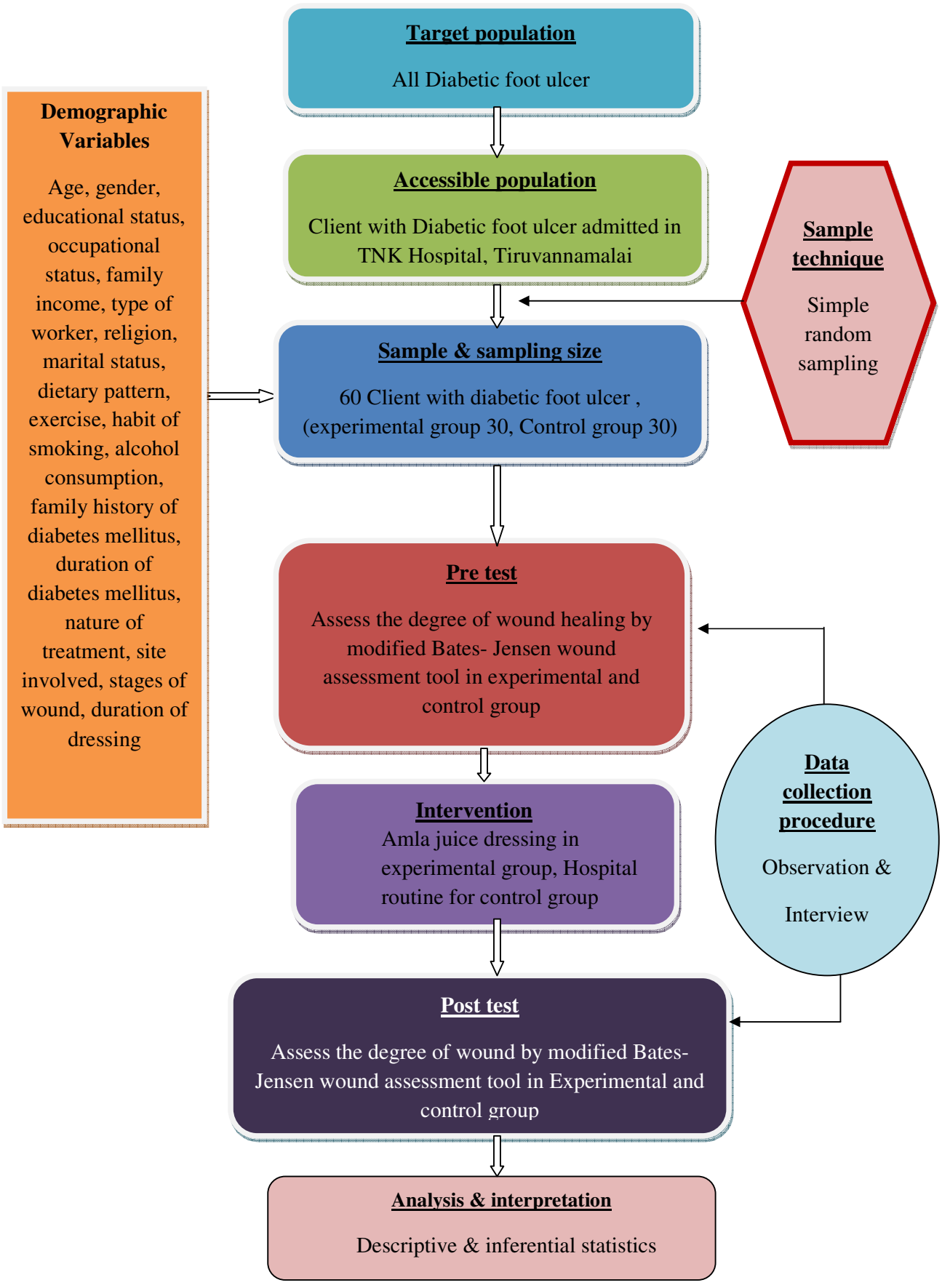
Descriptive Statistics

1. Frequency and percentage distribution to analyze demographic variables
2. Mean and standard deviation to analyze the pre and post test degree of wound healing.

Inferential Statistics

1. Paired ‘t’ test to compare between the pre and post test degree of wound healing among clients with Diabetic foot ulcer in experimental and control group
2. Unpaired ‘t’ test to compare the pre-test and post-test degree of wound healing among clients with Diabetic foot ulcer between experimental and control group.
3. ANOVA and unpaired ‘t’ test was used to associate the pre and post test mean difference degree of wound healing among client with Diabetic foot ulcer selected demographic variables in experimental and control group.

Fig 3.1.1 SCHEMATIC REPRESENTATION OF RESEARCH DESIGN



CHAPTER – 4

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of data collected from 60 Diabetic foot ulcer Client to assess the effectiveness topical application of Amla juice on Wound healing among Clients with Diabetic foot ulcer of at TNK Hospital, Tiruvannamalai. Statistical analysis is a method for rendering quantitative information meaning full and intelligible. This enables the researcher to summaries, organize, evaluate and interpret and communicate information in numerical form.

The data collected for the study were grouped and analyzed as per the objectives set for the study. Data analysis includes both descriptive and inferential statistics.

ORGANIZATION OF DATA

Section 4.1: Description of demographic variables among clients with Diabetic foot ulcer in experimental group and control group.

Section 4.2: Assessment of pre and post test degree of wound healing among clients with Diabetic foot ulcer in the experimental and control group.

Section 4.3: Comparison of pre and post test degree of wound healing among clients with Diabetic foot ulcer in experimental and control group.

Section 4.4: Comparison of pre test and post test degree of wound healing among clients with Diabetic foot ulcer between experimental and control group.

Section 4.5: Association of pre and post test mean difference degree of wound healing among clients with Diabetic foot ulcer with their selected demographic variable in experimental group.

Section 4.6: Association of pre and post test mean difference degree of wound healing among clients with Diabetic foot ulcer with their selected demographic variable in control group.

SECTION4.1: DESCRIPTION OF DEMOGRAPHIC VARIABLES AMONG CLIENTS WITH DIABETIC FOOT ULCER IN EXPERIMENTAL GROUP AND CONTROL GROUP.

Table 4.1.1: Frequency and percentage distribution of demographic variables of clients in respect to Age, Gender, Educational status, Occupation status, Monthly income, type of worker, Religion, Type of family in experimental and control group.

N=60

S.No.	Demographic Variables	Experimental Group		Control Group	
		f	%	f	%
1	**Age in years**				
	41 - 50 years	8	26.67	9,	30.00
	51 -60 years	12	40.00	10	33.33
	61 - 70 years	7	23.33	8	26.67
	>70 years	3	10.00	3	10.00
2	**Gender**				
	Male	22	73.33	21	70.00
	Female	8	26.67	9	30.00
3	**Educational status**				
	Non-literate	11	36.67	12	40.00
	Primary school	8	26.67	7	23.33
	Higher secondary school	6	20.00	8	26.67
	Graduate	5	16.67	3	10.00
4	**Occupational status**				
	Unemployed	3	10.00	3	10.00
	Unskilled	7	23.33	8	26.67
	Semi skilled	6	20.00	6	20.00
	Skilled	8	26.67	7	23.33
	Professional	3	10.00	3	10.00
	Others	3	10.00	3	10.00
5	**Monthly income**				
	< Rs 5000	10	33.33	9	30.00
	Rs 5001 - 10,000	10	33.33	9	30.00
	Rs 10,001 - 15,000	6	20.00	7	23.33
	> Rs 15,000	4	13.33	5	16.67

S.No.	Demographic Variables	Experimental Group		Control Group	
		f	%	f	%
6	**Type of physical activity**				
	Mild	7	23.33	7	23.33
	Moderate	6	20.00	7	23.33
	Heavy	11	36.67	9	30.00
	Sedentary	6	20.00	7	23.33
7	**Religion**				
	Hindu	21	70.00	20	66.67
	Christian	3	10.00	3	10.00
	Muslim	5	16.67	6	20.00
	Others	1	3.33	1	3.33
8	**Type of family**				
	Nuclear	15	50.00	11	36.67
	Joint	7	23.33	11	36.67
	Extended	8	26.67	8	26.67

Table 4.1.1 shows the frequency and percentage distribution of Age, Gender, Educational status, Occupational status, Monthly income, Type of work, Religion, Type of family.

In experimental group, with regard to Age 12(40%) were between the age group of 51- 60years, 8(26.67%) were between the age group of 41-50 years, 7(23.33%) were between the age group of 61-70years,and 3(10.00%) were in the age group of >70years.

In experimental group, with regard to Sex majority of the subjects 22(73.33%) were male and 8(26.67%) were female.

In experimental group, with regard to Educational status 11(36.67%) were non literates, 8(26.67%) had completed their primary school education, 6(20.00%) had completed their higher secondary school education and 5(16.67%) were graduate.

In experimental group, with regard to Occupational status 8(26.67%) were skilled, 7(23.33%) were unskilled, 6(20.67%) were semiskilled, 3(10.00%) were unemployed, 3(10.00%) were professionals and 3(10.00%) belongs to other category.

In experimental group, with regard to Monthly income 10(33.33%) were earning less than Rs.5000 per month, 10(33.33%) were earning between Rs 5001-10,000 per month, 6(20.00%) were earning between Rs 10,001-15,000, 4(13.33%) were earning more than 15,000 per month.

In experimental group, with regard to type of Physical activity 11(36.67%) were heavy activity 7(23.33%) were mild activity 6(20.00) were moderate activity and 6(20.00%) were sedentary activity.

In experimental group, with regard to Religion majority of the subjects 21(70.00%) were Hindus, 3(10.00%) were Christians, 3(10.00%) were Muslims and 1(3.33) belong to other religion.

In experimental group, with regard to Type of family, had 15(50.00%) were from nuclear family, 8(26.67%) belong to extended family, and 7(23.33%) belong to joint family.

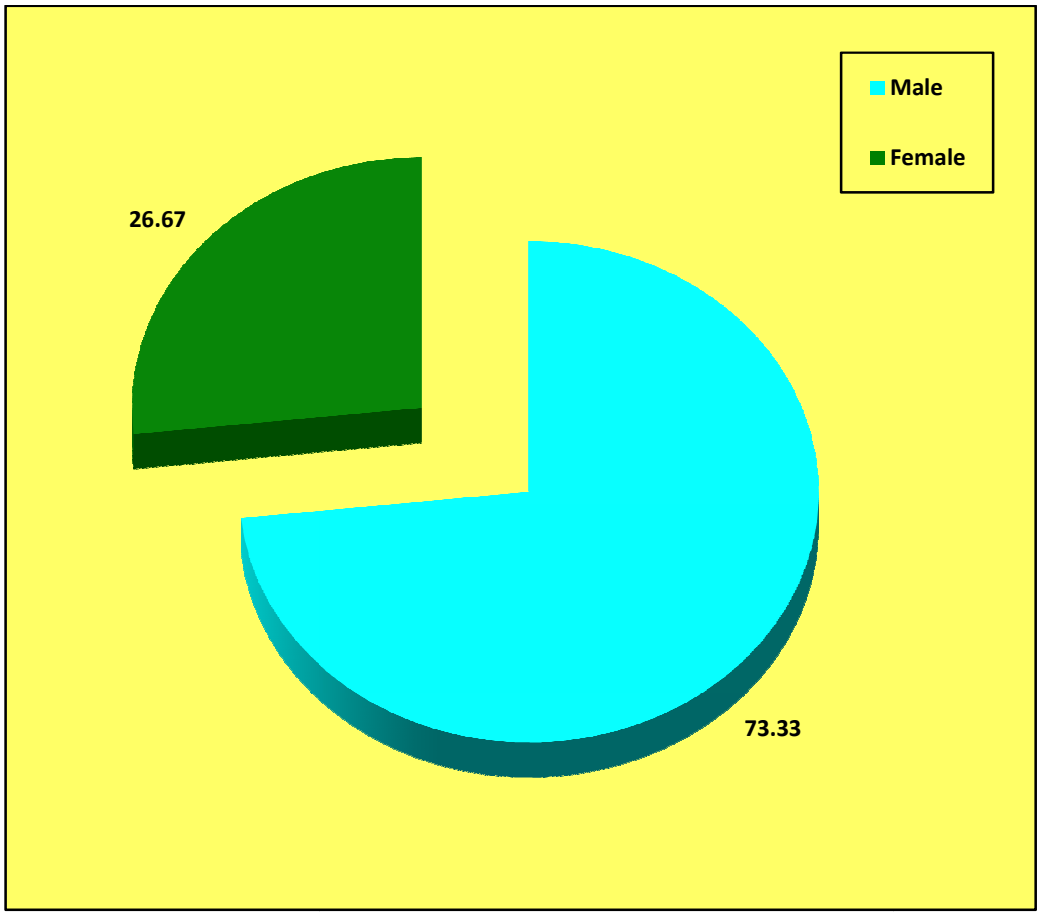


Fig.4.1.1: Percentage distribution of gender of the clients with diabetic foot ulcer in the Experimental group

In control group, with regard to Age 10(33.33%) were between the age group of 51-60yrs, 9(30.00%) client were between the age group of 41-50yrs, 8(26.67%) subjects were between the age group of 61-70yrs and 3(10.00%) clients were the age group of >70yrs.

In control group, with regard to Sex 21(70.00%) were male and 9(30.00%) were female.

In control group, with regard to Educational status 12(40.00%) were non literates, 8(26.67%) had completed their higher secondary school education, 7(23.33%) had completed primary school education and 3(10.00%) were graduates.

In control group, with regard to Occupational status 8(26.67%) were unskilled, 7(23.33%) were skilled 6(20.00%) were semiskilled, 3(10.00%) were unemployed, 3(10.00%) were professional and 3(10.00%) belongs to other category.

In control group with regard to Monthly income 9(30.00%) were earning less than Rs.5000 per month, 9(30.00%) were earning between Rs 5001-10,000 per month, 7(23.33%) were earning between Rs 10,001-15,000, 5(16.67%) were earning more than 15,000 per month.

In control group, with regard to type of Physical activity 9(30.00%) were heavy worker, 7(23.33%) were mild activity 7(23.33) were moderate activity and 7(23.33%) were sedentary activity.

In control group with regard to Religion majority of the subjects 20(66.67%) were Hindus, 6(20.00%) were Muslims, 3(10.00%) were Christians and 1(3.33) belonged to other religion.

In control group with regard to Type of family 11(36.67%) belong to nuclear family, 11(36.67%) belong to joint family, 8(26.67%) belong to extended family.

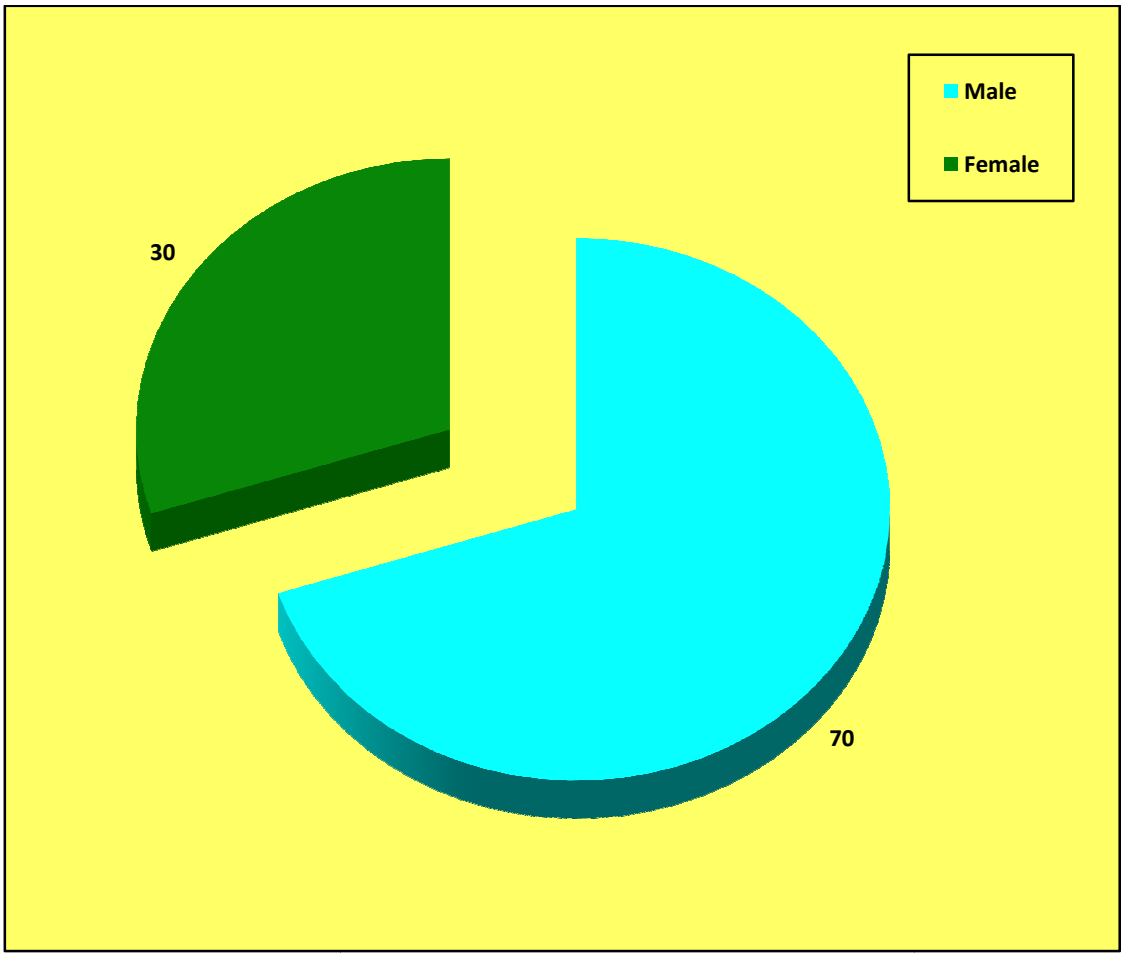


Fig.4.1.2: Percentage distribution of gender of the clients with diabetic foot ulcer in the Control group

Table 4.1.2: Frequency and percentage distribution of demographic variables of clients in respect to Marital status, Dietary pattern, Exercise, Habit of smoking, consumption of Alcohol, Family history of diabetes mellitus, Type of diabetic of Experimental and Control group.

N = 60

S.No.	Demographic variables	Experimental Group		Control Group	
		f	%	f	%
9	**Marital status**				
	Single	1	3.33	2	6.67
	Married	19	63.33	19	63.33
	Divorced	2	6.67	2	6.67
	Widow or Widower	8	26.67	7	23.33
10	**Dietary pattern**				
	Vegetarian	8	26.67	8	26.67
	Non-vegetarian	22	73.33	22	73.33
11	**Exercise**				
	Yes	8	26.67	7	23.33
	No	22	73.33	23	76.67
12	**Habit of smoking**				
	Yes	12	40.0	15	50.00
	No	18	60.0	15	50.00
13	**Consumption of alcohol**				
	Yes	16	53.33	16	53.33
	No	14	46.67	14	46.67
14	**Family history of diabetes mellitus**				
	Yes	4	13.33	5	16.67
	No	26	86.67	25	83.33
15	**Type of diabetes mellitus**				
	Type I	11	36.67	11	36.67
	Type II	19	63.33	19	63.33

Table 4.1.2: Table shows Frequency and percentage distribution of demographic variables of clients in respect to Marital status, Dietary pattern, Exercise, Habit of smoking, consumption of Alcohol, Family history of diabetes mellitus, Type of diabetic of Experimental and Control group

In experimental group, with regard to Marital status majority of the subjects 19(63.33%) were married, 8(26.67%) were widow/widower, 2(6.67%) were divorced and 1(3.33%) belongs to single category.

In experimental group, with regard to Dietary pattern majority of the subjects 22(73.33%) were non vegetarian and 8(26.67%) were vegetarian.

In experimental group, with regard to Exercise majority of the subjects 22(73.33%) were not performing the exercise and 8(26.67%) were performing the exercise.

In experimental group, with regard to Habit of smoking majority of the subjects 18(60.0%) do not have the habit of smoking and 12(40.0%) had the habit of smoking,

In experimental group, with regard to consumption of alcohol majority of the subjects 16 (53.33%) consume alcohol and 14(46.67%) do not consume alcohol.

In experimental group, with regard to Family history of diabetes mellitus majority of subjects 26(86.67%) had no family history of diabetes and 4(13.33) had family history of diabetes.

In experimental group, with regard to Type of Diabetes mellitus majority of the subjects is 19(63.33) had Type 2 DM and 11(36.67%) had Type 1 DM

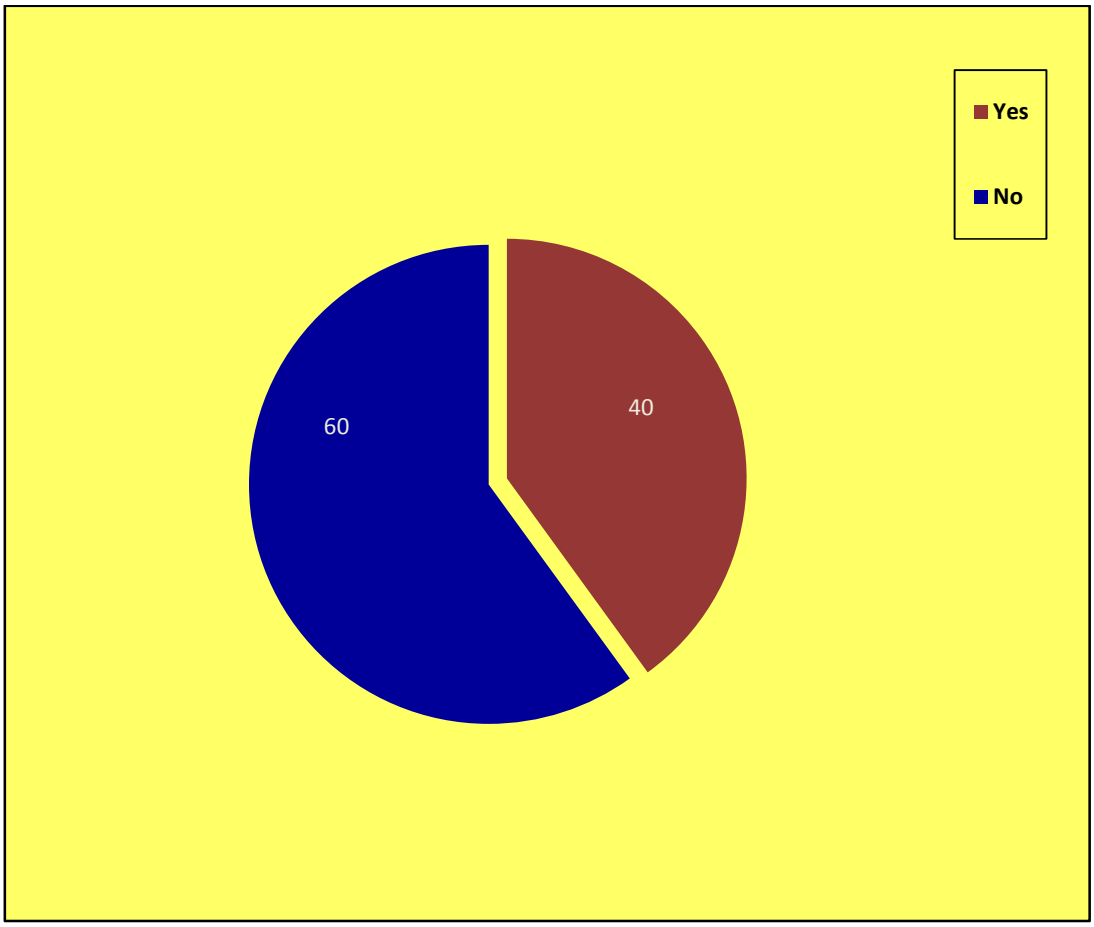


Fig.4.1.3: Percentage distribution of habit of smoking of clients with diabetic foot ulcer in the Experimental group

In control group, with regard to Marital status 19(63.33%) were married, 7(23.33%) were widow/widower, 2(6.67%) were divorced and 2(6.67%) were single.

In control group, with regard to Dietary pattern majority of the subjects 22(73.33%) were non vegetarian and 8(26.67%) were vegetarian.

In control group, with regard to Exercise majority of the subjects 23(76.67%) were not performing the exercise and 7(23.33%) were performing the exercise.

In control group, with regard to Habit of smoking 15(50.0%) do not have the habit of smoking and 15(50.0%) had the habit of smoking,

In control group, with regard to consumption of alcohol 16(53.33%) consume alcohol and 14(46.67%) do not consume alcohol.

In control group, with regard to Family history of diabetes mellitus majority of the clients 25(83.33%) had no family history of diabetes and 5(16.67%) had family history of diabetes.

In control group, with regard to Type of Diabetes mellitus majority of the subjects is 19(63.33) had Type 2 DM and 11(36.67%) had Type 1 DM

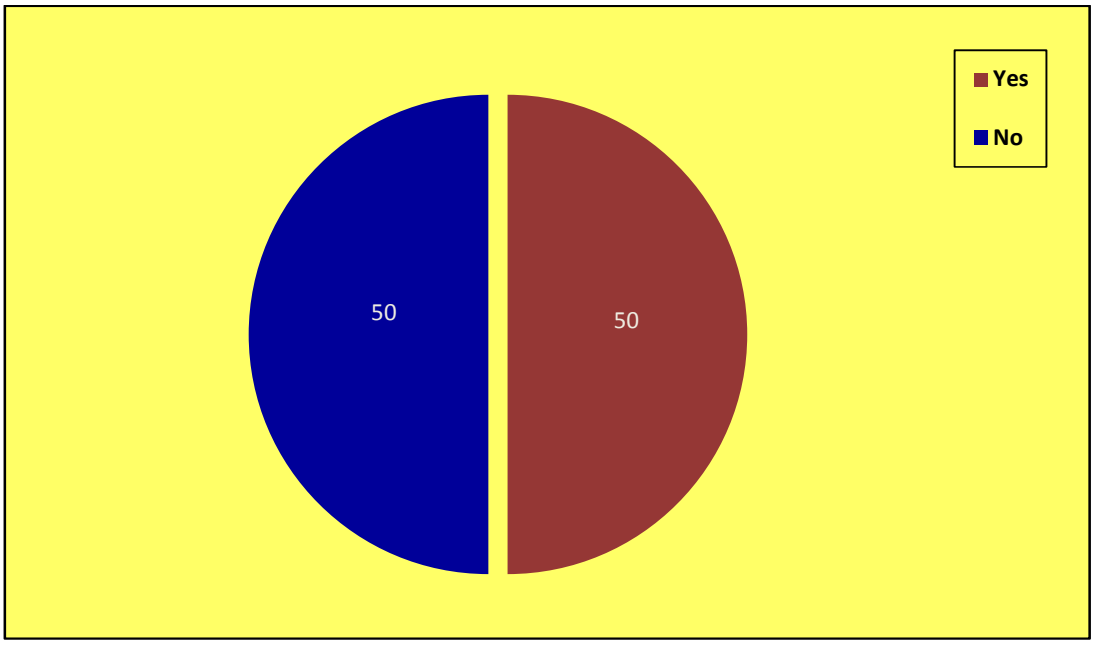


Fig.4.1.4: Percentage distribution of habit of smoking of clients with Diabetic foot ulcer in the Control group

Table-4.1.3 Frequency and percentage distribution of demographic variables of the clients in respect to Duration of diabetic treatment, Nature of treatment, Site of diabetic foot ulcer, Type of wound, Duration of diabetic foot ulcer, Duration of dressing diabetic foot ulcer in Experimental and control group.

N = 60

S.No.	Demographic variable	Experimental group		Control group	
16	**Duration of diabetic treatment**	f	%	f	%
	1-2 years	6	20.00	4	13.33
	3-4 years	8	26.67	6	20.00
	5-6 years	11	36.67	12	40.00
	Above 6 years	5	16.67	8	26.67
17	**Nature of treatment**				
	Oral hypoglycemic agents	22	73.33	19	63.33
	Insulin	7	23.33	8	26.67
	Diet control /exercises	1	3.33	2	6.67
	All the above	0	0.00	1	3.33
18	**Site of Diabetic foot ulcer**				
	Right lateral	5	16.67	4	13.33
	Left lateral	5	16.67	5	16.67
	Right sole	6	20.00	6	20.00
	Left sole	4	13.33	4	13.33
	Right heel	6	20.00	6	20.00
	Left heel	4	13.33	5	16.67
19	**Type of wound (or) stage**				
	Non-blanchable redness	2	6.67	4	13.33
	Blister	4	13.33	6	20.00
	Exposed subcutaneous	14	46.67	11	36.67
	Exposed muscle and bone	10	33.33	9	30.00
20	**Duration of diabetic foot ulcer**				
	<1 year	17	56.67	15	50.00
	1 - 2 years	6	20.00	6	20.00
	2 - 3 years	4	13.33	5	16.67
	>3 years	3	10.00	4	13.33
21	**Duration of dressing for diabetic foot ulcer**				
	<3 months	15	50.00	11	36.67
	4 - 6 months	11	36.67	8	26.67
	7 - 9 months	3	10.00	6	20.00
	Above 9 months	1	3.33	5	16.67

Table 4.1.3 shows Frequency and percentage distribution of demographic variables of the clients in respect to Duration of diabetic treatment, Nature of treatment, Site of diabetic foot ulcer, Type of wound, Duration of diabetic foot ulcer, Duration of dressing diabetic foot ulcer in Experimental and control group.

In experimental group, with regard to Duration of diabetic treatment 11(36.67%) were between 5years- 6 years, 8(26.67%) were between 3years- 4years, 6(20.00%) were between 1years- 2years and 5(16.67%) were above 6 years.

In experimental group, with regard to Nature of treatment majority of the subjects 22(73.33%) were taking oral medication, 7(23.33%) were taking insulin and 1(3.33%) had diet control/ exercise.

In experimental group, with regard to Site of Diabetic foot ulcer 6(20.00%) had ulcer on right sole of leg, 6(20.00%) had ulcer on right heel, 5(16.67%) had ulcer on right lateral, 5(16.67%) had ulcer on left lateral, 4(13.33%) had ulcer on left heel and 4(13.33%) had ulcer on left sole.

In experimental group, with regard to Type of wound (or) stage 14(46.67%) had subcutaneous, 10(33.33%) had exposed muscle, 4(13.33%) had blister and 2(6.67%) had non –blanchable redness.

In experimental group, with regard to Duration of diabetic foot ulcer 17(56.67%) had duration less than 1 year, 6(20.00%) had duration between 1-2 years, 4(13.33%) had duration between 2-3years and 3(10.00) had a duration > 3years.

In experimental group, with regard to Duration of diabetes foot ulcer dressing majority of the subjects 15(50.00%) were < 3 month, 11(36.67%) were between the 4-6month, 3(10.00%) were between 7-9 months and 1(3.33%) was between the above 9 month,.

In control group, with regard to Duration of diabetic treatment 12(40.00%) were between 5- 6 years, 8(26.67%) were above 6 years, 6(20.00%) were between3- 4years and 4(13.33%) were between 1- 2 yrs.

In control group, with regard to Nature of treatment 19(63.33%) of them taking oral medication, 8(26.67%) of them taking insulin and 1(3.33%) had diet control/ exercise.

In control group, with regard to Site of diabetic foot ulcer 6(20.00%) had ulcer on right sole in leg, 6(20.00%) had ulcer on right heel, 4(13.33%) had ulcer on right lateral, 5(16.67%) had ulcer on left lateral, 5(16.67%) had ulcer on left heel and 4(13.33%) had ulcer on left sole.

In control group, with regard to Type of wound (or) stage 11(36.67%) had exposed subcutaneous, 9(30.00%) had exposed muscle, 6(20.00%) had blisters and 4(13.33%) had non –blanchable redness.

In control group, with regard to Duration of diabetic foot ulcer 15(50.00%) < 1 year, 6(20.00%) were between the 1-2 years, 5(16.67%) were between the 2-3 years and 4(13.33) > 3years.

In control group, with regard to Duration of diabetes foot ulcer dressing 11(36.67%) were less than 3 months, 8(26.67%) were between the 4-6months, 6(20.00%) were between 7-9 months, 5(16.67%) were between the above 9 month.

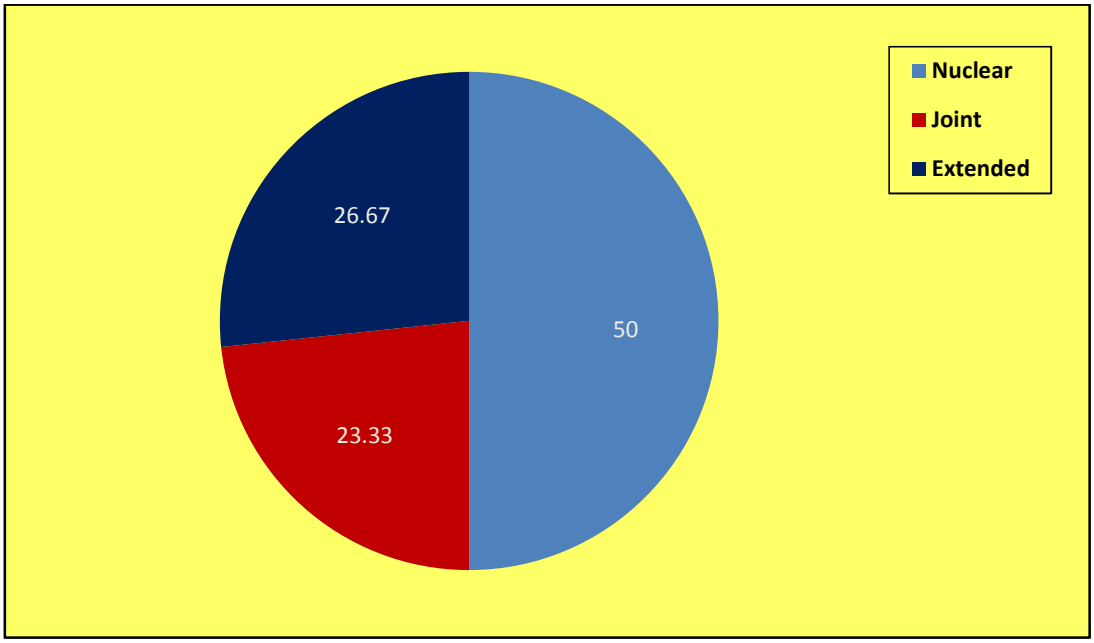


Fig.4.1.5: Percentage distribution of type of family of clients with diabetic foot ulcer in the Experimental group

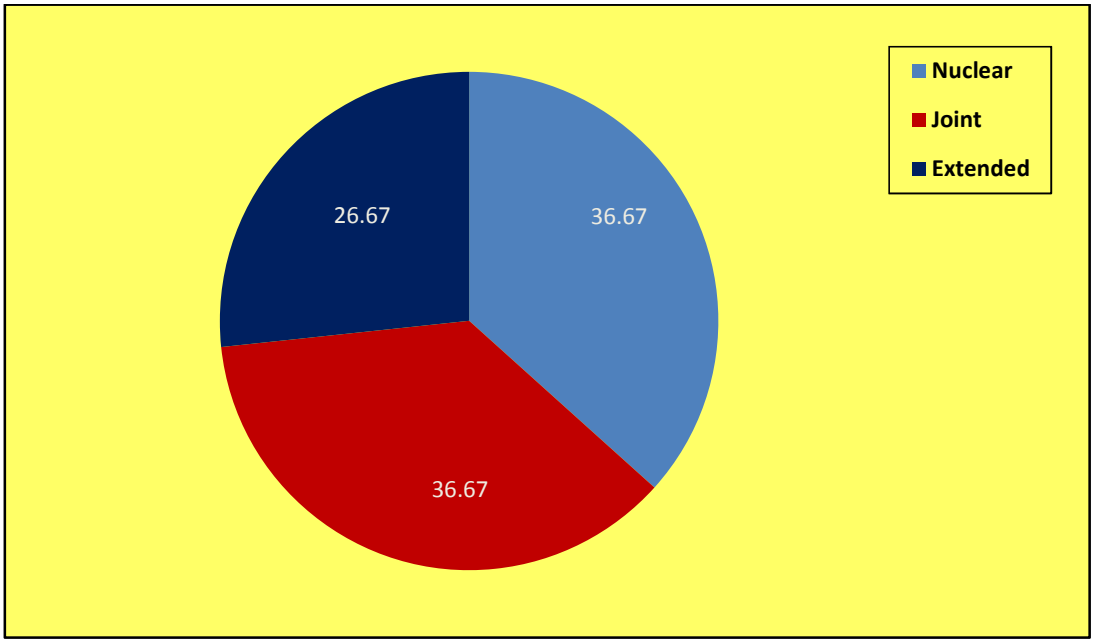


Fig.4.1.6: Percentage distribution of type of family of clients with diabetic foot ulcer in the Control group

SECTION 4.2: ASSESSMENT OF PRE AND POST TEST DEGREE OF WOUND HEALING AMONG CLIENTS WITH DIABTIC FOOT ULCER IN EXPERIMENTAL AND CONTROL GROUP.

Table 4.2: Frequency and percentage distribution of pre test and post test degree of wound healing in experimental and control group.

N = 60

S.No.	Group		Tissue health 1- 12		Wound regeneration 13– 20		Mild wound regeneration 21 – 30		Moderate wound degeneration 31– 40	
			f	%	f	%	f	%	f	%
1	Experimental	Pretest	-	-	-	-	22	73.33	8	26.67
		Post test	2	6.67	18	60.0	10	33.33	-	-
2	Control	Pretest	-	-	-	-	24	80.0	6	20.0
		Post Test	-	-	2	6.67	23	76.67	5	16.67

Table 4.2 shows that the frequency and percentage distribution of pretest and post test degree of wound healing in experimental and control group

The analysis on pretest degree of wound healing in experimental group, revealed that 22(73.33%) had mild wound regeneration and 8(26.37%) had moderate wound degeneration.

The analysis on post test degree of wound healing in experimental group, revealed that 18(60.0%) had wound degeneration and 10(33.33%) had mild wound regeneration and remaining 2(6.67%) had tissue health.

The analysis on pretest degree of wound healing in control group, revealed that 24(80.0%) had mild wound generation and 6(20.0%) had moderate wound regeneration.

The analysis on post test degree of wound healing in control group revealed that 21(70.0%) had mild wound regeneration and 5(16.67%) had moderate wound regeneration and remaining 2(6.67%) had wound regeneration.

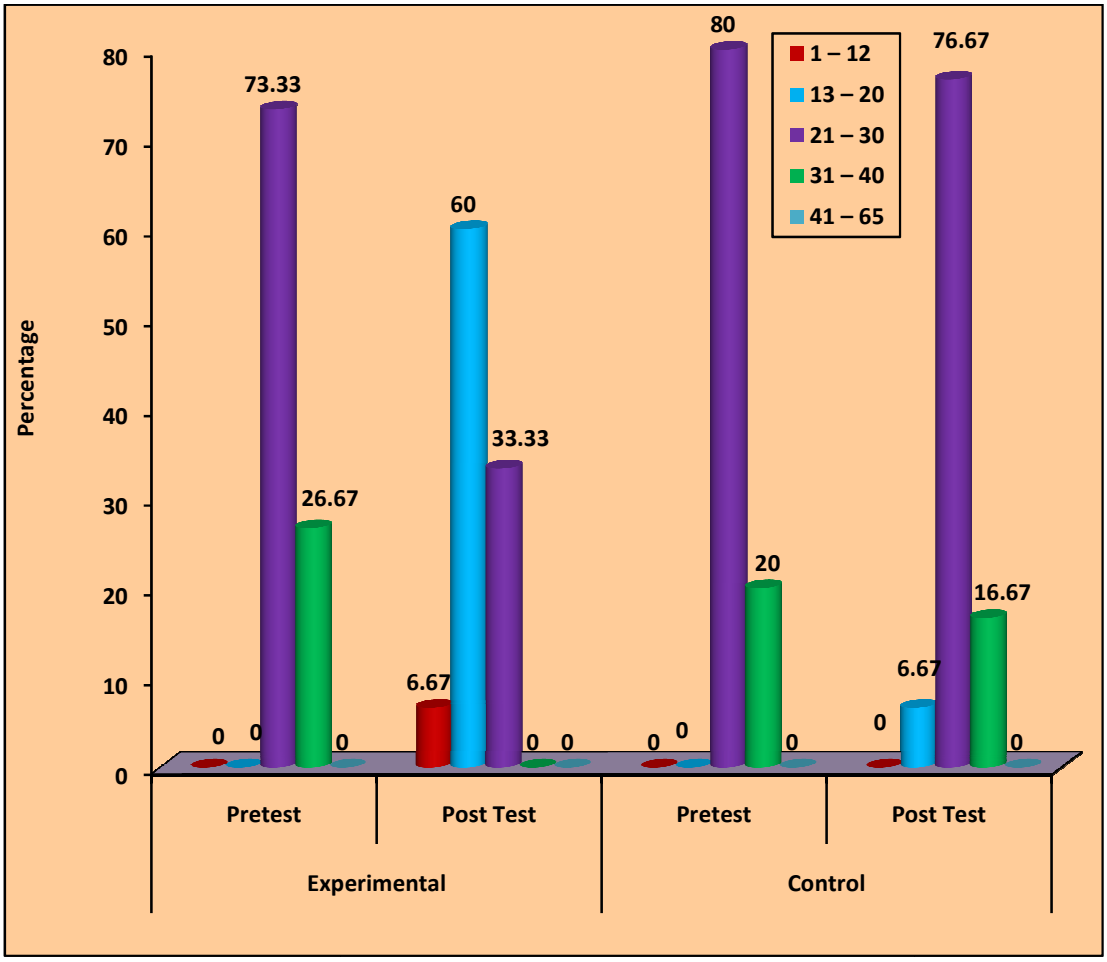


Fig.:4.2.1 Percentage distribution of pretest and post test level of wound healing among clients with diabetic foot ulcer in the experimental and control group

SECTION-4.3 COMPARISON OF PRE TEST AND POST TEST DEGREE OF WOUND HEALING AMONG CLIENTS WITH DIABETIC FOOT ULCER IN EXPERIMENTAL AND CONTROL GROUP.

Table 4.3: Comparison of pretest and post test degree of wound healing among clients with diabetic foot ulcer in the experimental and control group.

N = 60

S.No.	Group	Assessment	Mean	S.D	Paired 't' Value
1	Experimental	Pretest	27.93	2.74	t = 7.591***
		Post Test	21.16	4.95	p = 0.000, S
2	Control	Pretest	27.63	2.82	t = 2.408*
		Post Test	26.97	3.21	p = 0.023, S

***p<0.001, *p<0.05, S – Significant

Table 4.3 shows comparison of pretest and post test degree of wound healing among clients with Diabetic foot ulcer in the experimental and control group**.**

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In experimental group, the pretest mean value of wound healing was 27.93 with S.D 2.74 and the post test mean value was 21.16 with S.D 4.95. The calculated paired 't' value t= 7.591 was statistically significant at p<0.001 level.

In control group the pretest mean value of wound healing was 27.63 with S.D 2.82 and the post test mean value was 26.97 with S.D 3.21. The calculated paired 't' value t= 2.408 was statistically significant at p<0.05 level.

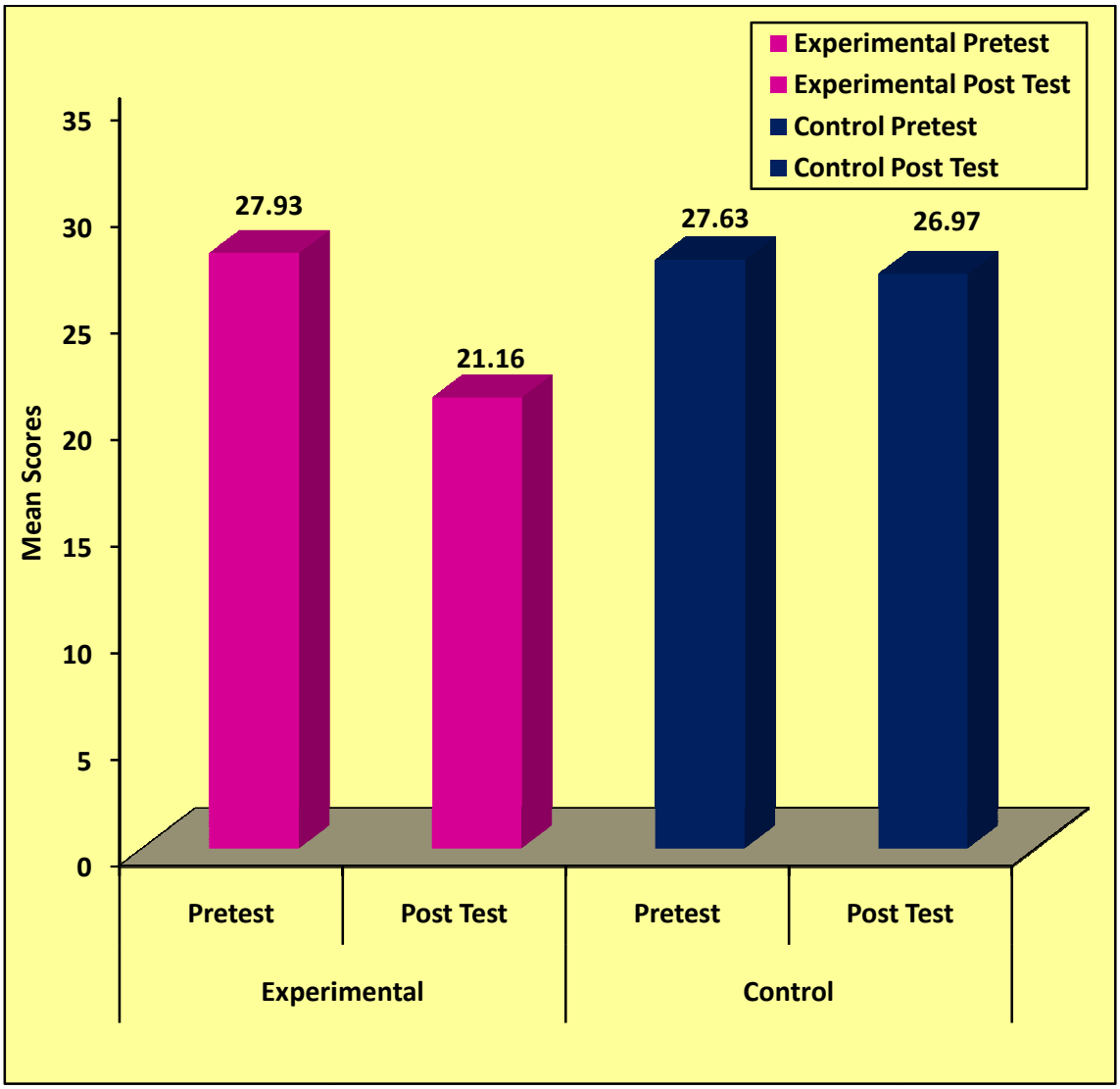

Fig.4.3.1: Comparison of pretest and post test wound healing score among clients with diabetic foot ulcer in the experimental and control group

SECTION- 4.4 COMPARISON OF PRE TEST AND POST TEST DEGREE OF WOUND HEALING AMONG CLIENTS WITH DIABETIC FOOT ULCER BETWEEN EXPERIMENTAL AND CONTROL GROUP.

Table 4.4.1: Comparison of pre and post test degree of wound healing between experimental group and control group.

N = 60

S.No.	Assessment	Group	Mean	S.D	Unpaired 't' Value
1	Pretest	Experimental	27.93	2.74	t = 0.418
		Control	27.63	2.82	p = 0.678, N.S
2	Post Test	Experimental	21.16	4.95	t = 5.380
		Control	26.96	3.21	p = 0.000, S***

***p<0.001, S – Significant, N.S – Not Significant

Table 4.4.1 shows that Comparison of pre and post test degree of wound healing between experimental group and control group**.**

The pretest mean value degree of wound healing in Experimental group, was 27.93 with S.D 2.74 and the pretest mean value of wound healing in control group was 27.63 with S.D 2.82. The calculated unpaired 't' value t= 0.418 was found to be statistically not significant.

The post test mean value degree of wound healing in Experimental group was 21.16 with S.D 4.95 and the post test mean value degree of wound healing in control group was 26.96 with S.D 3.21. The calculated unpaired 't' value t= 5.380 was statistically significant at p<0.001 level.

This clearly indicates that the Amla juice application administered to the clients in the experimental group had significant improvement in their post test degree of wound healing than the clients in the control group who had undergone normal hospital routine.

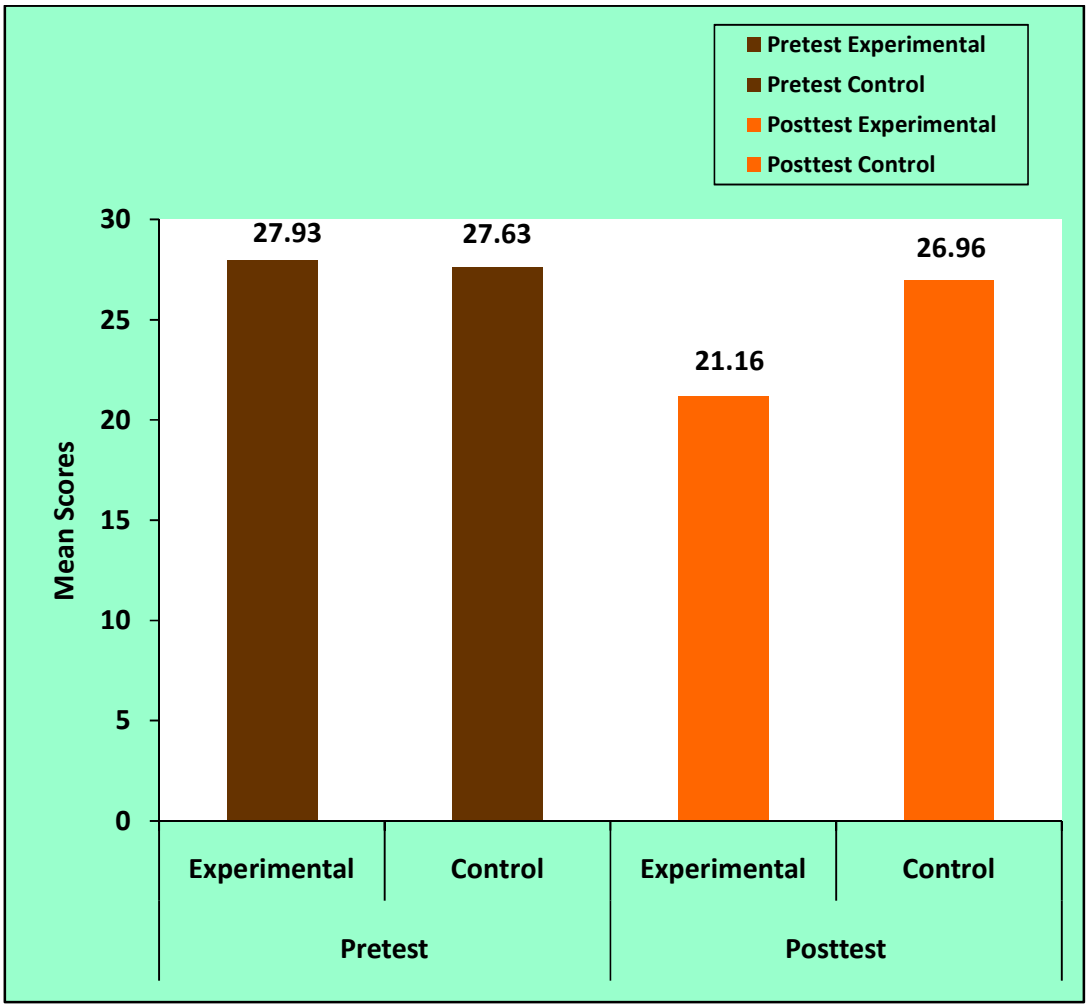

Fig.4.4.1: Comparison of pretest and post test degree of wound healing score among clients with diabetic foot ulcer between the experimental and control group

SECTION-4.5: ASSOCIATION OF PRE TEST AND POST TEST MEAN DIFFERENCE DEGREE OF WOUND HEALING AMONG CLIENTS WITH DIABETES FOOT ULCER WITH THEIR SELECTED DEMOGRAPHIC VARIABLES IN EXPERIMENTAL GROUP.

Table 4.5.1: Association of mean differed score of wound healing among clients with diabetes foot ulcer with their selected demographic variables Habit of smoking, Family history of diabetes mellitus in experimental group.

n=30

S.No.	Demographic Variables	Pretest		Post Test		Mean Diff.		ANOVA/ Unpaired 't' Value
		Mean	S.D	Mean	S.D	Mean	S.D	
1	**Habit of smoking**							t = 2.341 p = 0.027 S*
	Yes	28.75	2.05	24.25	2.26	4.50	1.31	
	No	27.05	2.62	23.83	2.09	3.22	1.66	
2	**Family history of diabetes mellitus**							t = 7.418 p = 0.000 S***
	Yes	27.25	2.21	29.00	0.81	-1.75	2.21	
	No	28.03	2.83	19.96	4.13	8.07	3.69	

*P<0.05, ***p<0.001, S – Significant, NS – Not significant

The tables 4.5.1 revealed that the demographic variable Habit of smoking and Family history of diabetes mellitus had shown statistically significant association with mean difference degree of wound healing at $p<0.05$ and $p<0.001$ level respectively. The other demographic variables had not shown statistically significant association with the mean differed score of wound healing among clients with diabetes foot ulcer in the experimental group.

SECTION-4.6 ASSOCIATION OF PRE TEST AND POST TEST MEAN DIFFERENCE DEGREE OF WOUND HEALING AMONG CLIENTS WITH DIABETES FOOT ULCER WITH THEIR SELECTED DEMOGRAPHIC VARIABLES IN CONTROL GROUP.

Table 4.6.1: Association of mean differed score of wound healing among clients with diabetes foot ulcer with their selected demographic variables Gender and Marital status in control group.

n = 30

S.No.	Demographic Variables	Pretest		Post Test		Mean Diff.		ANOVA/unpaired 't' value
		Mean	S.D	Mean	S.D	Mean	S.D	
1	**Gender**							t = 2.449 p = 0.037 S*
	Male	28.14	2.74	27.19	3.41	0.95	1.74	
	Female	26.44	2.78	26.44	2.78	0.00	0.00	
2	**Marital Status**							F = 14.790 p = 0.000 S**
	Single	30.00	5.65	25.00	7.07	5.00	1.41	
	Married	27.31	2.82	26.89	3.28	0.42	1.07	
	Divorced	26.00	2.82	25.00	1.41	1.00	1.41	
	Widow or Widower	28.28	2.05	28.28	2.05	0.00	0.00	

*P<0.05, p<0.01, S – significant, NS – not significant

Table 4.6.1 shows that there was statistically significant association of mean difference degree of wound healing with Gender and Marital status at p<0.05 and p<0.01 level respectively.

Table 4.6.2: Association of mean difference pre and post test degree of wound healing among clients with diabetes foot ulcer with their selected demographic variables Exercise, Family history of diabetes mellitus in control group.

n = 30

S.No.	Demographic Variables	Pretest		Post Test		Mean Diff.		ANOVA/ Unpaired 't' value
		Mean	S.D	Mean	S.D	Mean	S.D	
1	**Exercise**							t = -2.472 p = 0.022 S*
	Yes	27.42	2.99	27.42	2.99	0.00	0.00	
	No	27.69	2.83	26.82	3.32	0.86	1.68	
2	**Family history of diabetes mellitus**							t= -2.449 p = 0.022 S*
	Yes	26.80	3.03	26.80	3.03	0.00	0.00	
	No	27.80	2.81	27.00	3.30	0.80	1.63	

*P<0.05, S – significant, NS – not significant

Table 4.6.2 shows that there was statistical significant association of mean difference degree of wound healing with Exercise and Family history of diabetes mellitus at p<0.05 level and no significant association was observed with other demographic variables in the control group.

CHAPTER – 5

DISCUSSION

The study was conducted to evaluate the effectiveness of topical application of Amla juice on wound healing among clients with Diabetic foot ulcer.

The discussion is based on the objectives, the review of literature and null hypothesis specified in this study.

5.1 The first objective was to assess the Pre test degree of wound healing among clients with diabetic foot ulcer in experimental and control group.

The analysis on pretest degree of wound healing in experimental group, revealed that 22(73.33%) subjects had mild wound regeneration and 8(26.37%) had moderate wound degeneration.

The analysis on pretest degree of wound healing in control group, revealed that 24(80.0%) subjects had mild wound generation and 6(20.0%) had moderate wound regeneration.

5.2 The second objective was to assess the Post test degree of wound healing among clients with diabetic foot ulcer in experimental and control group.

.The analysis on post test degree of wound healing in experimental group, revealed that 18(60.0%) subjects had wound degeneration and 10(33.33%) had mild wound regeneration and 2(6.67%) tissue health.

The analysis on post test degree of wound healing in control group revealed that 21(70.0%) subjects had mild wound regeneration and 5(16.67%) had moderate wound regeneration and 2(6.67%) had wound regeneration.

Vidushan, et al., (2012) conduced true experimental study to compare the effectiveness of Amla dressing on Diabetic foot ulcer among diabetes patient Amla dressing in diabetic foot ulcers with controlled dressing group (povidone iodine followed by normal saline). Surgical debridement and appropriate antibiotics were prescribed in all patients. There were 30 patients age between 31 to 65 years old 52%.

had mild wound regeneration. moderate wound regeneration 4(12.6%) Amla group ($p<0.0001$). The study findings revealed that, ulcer healing was significantly improved in experimental group.

5.3 The third objective was to compare the pre and post test degree of wound healing among clients with diabetic foot ulcer in experimental group.

In experimental group the analysis on pre test mean value and standard deviation degree of wound healing was 27.93 and 2.74 and Post test mean value and standard deviation on degree of wound healing was 21.16 and 4.95. The calculated paired 't' value t= 7.591 there was significant at $p<0.001$ level. This clearly indicates that the Topical application of Amla juice had shown a significant improvement in the post test degree of wound healing among clients with diabetic foot ulcer than the control group.

Hence the null hypothesis **(NH_1)** stated earlier that **"there is a no significant difference between pre and post test degree of wound healing in experimental group at P< 0.05"** was rejected.

5.4 The fourth objective was to compare the pre and post test degree of wound healing among clients with diabetic foot ulcer in control group.

In control group analysis on the pre test mean value and standard deviation of wound healing in control group was 27.63 and 2.82. The Post test mean value and standard deviation on the degree of wound healing in control group 26.97 and 3.21 calculated Paired 't' value t= 2.408 was a significant at $p<0.05$ level.

Hence the null hypothesis **(NH_2)** stated earlier that **"there is a no significant difference between pre and post test degree of wound healing in control group"** was rejected.

5.5 The fifth objective was to compare the pre test degree of wound healing between experimental group and control group

In analysis on the pre test mean value and standard deviation on degree of wound healing in experimental group was 27.93 and 2.74. The pre test mean value and standard

deviation on degree of wound healing in control group was 27.63 and 2.82. The calculated unpaired 't' value t= 0.418 was not significant at p<0.001 level.

5.6 The six objective was to compare the post test degree of wound healing between experimental and control group.

In analysis on the post test mean value and standard deviation on degree of wound healing in experimental group was 21.16 and 4.94. The post test mean value and standard deviation on degree of wound healing in control group was 26.96 and 3.321. The calculated unpaired 't' value t= 5.380 was significant at p<0.001 level, which indicates that there was difference in the post test degree of wound healing between the groups, this clearly indicates that the Topical application Amla juice to improvement the degree of wound healing in the experimental group.

Hence, the null hypothesis (NH_3) stated earlier that **"there is no significant difference in the post test degree of wound healing among clients with diabetic foot ulcer between experimental and control group at p < 0.05"** was rejected.

5.7 The seventh objective was to associate the pre and post test d mean difference degree of wound healing with selected demographic variables in experimental group.

There is a statistical significant association degree of wound healing on diabetic foot ulcer client with demographic variables like habit of smoking and family history of diabetes mellitus in experimental group at p<0.05 and p<0.001 level respectively and there is no statistical significance association with other demographic variables in experimental group.

Hence the null hypothesis (NH_4) stated earlier that **"there is no significant association in the pre test and post test mean difference degree of wound healing among clients with Diabetic foot ulcer with their selected demographic variables in clients in experimental group at p<0.05"** was rejected for habit of smoking and family history of diabetes mellitus and for other demographic variables hence formulated hypothesis is retained.

5.8 The eight objective was to associate the mean difference pre and post test degree of wound healing with selected demographic variables in control group.

There is a low statistical significant association degree of wound healing on diabetic foot ulcer client with demographic variables like gender, exercise and family history of diabetes mellitus in control group at $p<0.05$ and for marital status at $p<0.01$ level and there is no statistical significance association with other demographic variables in control group.

Hence the null hypothesis **(NH_5)** stated earlier that **"there is no significant association in the pre test and post test mean difference degree of wound healing with selected demographic variables in clients in control group at p<0.05"** was rejected for gender, exercise, marital status and family history of diabetes mellitus and for other demographic variables retained.

CHAPTER – 6

SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

This chapter deals with summary of the study, conclusion drawn, implications, recommendations and limitations of the study.

6.1 SUMMARY

The study was undertaken to determine the effectiveness of Amla juice on wound healing among clients with Diabetic foot ulcer at Selected Hospital in Tiruvannamalai**.**

Diabetes mellitus (DM) represents several diseases in which high blood glucose levels over time can damage the nerves, kidneys, eyes, and blood vessels. Diabetes can also decrease the body's ability to fight infection. When diabetes is not well controlled, damage to the organs and impairment of the immune system is likely. Foot problems commonly develop in people with diabetes and can quickly become serious. With damage to the nervous system, a person with diabetes may not be able to feel his or her feet properly. Normal sweat secretion and oil production that lubricates the skin of the foot is impaired. These factors together can lead to abnormal pressure on the skin, bones, and joints of the foot during walking and can lead to breakdown of the skin of the foot. Sores may develop. Damage to blood vessels and impairment of the immune system from diabetes makes it difficult to heal these wounds.

Due to the prevalence and disease causing potential of Diabetic foot ulcer, there is a need for evidence-based interventions, which may contribute to the management of Diabetic foot ulcer clients. The investigator felt that the Amla juice dressing is a alternative therapy for wound healing among clients with diabetic foot ulcer.

6.2 The objectives of the study were

1. To assess the Pre test degree of wound healing among clients with Diabetic foot ulcer in Experimental and control group.
2. To assess the post test degree of wound healing among clients with Diabetic foot ulcer in Experimental group and control group.

3. To compare the pre and post test degree of wound healing among client with Diabetic foot ulcer in Experimental group.
4. To compare the pre and post test degree of wound healing among client with Diabetic foot ulcer in Control group.
5. To compare the pre test degree of wound healing among clients with Diabetic foot ulcer between Experimental and Control group.
6. To compare the post test degree of wound healing among clients with Diabetic foot ulcer between the Experimental and Control group.
7. To determine association in the post test mean difference score of wound healing with selected demographic variables in Experimental group.
8. To determine association in the pre test and post test mean difference score of wound healing with selected demographic variables in Control group.

6.3 The study was based on the assumptions that

1. Client with diabetic foot ulcer may have delayed wound healing.
2. Amla juice application may improve the degree of wound healing for client with diabetic foot ulcer.

6.4 The null hypotheses formulated were

NH_1: There is no significant difference between the pre test and post test degree of wound healing among clients with Diabetic foot ulcer in experimental group at $p<0.05$.

NH_2: There is no significant difference between the pre test and post test degree of wound healing among clients with Diabetic foot ulcer in control group at $p<0.05$.

NH_3: There is no significant difference in the post test degree of wound healing among clients with Diabetic foot ulcer between experimental and control group at $p<0.05$.

NH_4: There is no significant association of pre test and post test mean deference score of wound healing among clients with Diabetic foot ulcer with selected demographic variables in experimental group at $p<0.05$.

NH_5: There is no significant association pre test and post test in mean difference degree of wound healing among clients with Diabetic foot ulcer with selected demographic variables in control group at $p<0.05$.

The conceptual framework for this study was developed based on Orlando's Deliberate Nursing Process Model and provided the comprehensive framework for evaluating the effectiveness of Amla juice application. The major components of this theory are patient behavior, Nurse Reaction, Nurse Activity.

The broad review of related literature, professional experience and expert's guidance which provides the strong foundation for the study including the basis for the conceptual framework and formation of the tool.

The review of literature

- Reviews related to diabetes mellitus
- Reviews related to diabetic foot ulcer.
- Reviews related to complication of diabetic foot ulcer
- Reviews related to Amla juice application on Diabetic foot ulcer

The research design used in this study was pretest and post test only design which comes under true experimental study. In this study simple random technique (lottery method) was used to select the Clients.

The content validity of the tool was obtained from 7 experts and reliability done by inter-rater reliability method. The pilot study was conducted in the TNK Hospital, Tiruvannamalai.

The main study was conducted in TNK Hospital, Tiruvannamalai, on 60 samples using simple random sampling technique, in that 30 were allotted to experimental group and 30 control group alternatively.

The data collected were analyzed and interpreted based on the objectives and null hypothesis using descriptive and inferential statistics. The finding revealed that there was a highly significant difference in the degree of wound healing.

The major findings of the study revealed that,

In comparison of the pre test and post test degree of wound healing among clients with Diabetic foot ulcer in experimental group, revealed that the calculated

paired ‘t’ value t= 7.591 was found to be statistically significant at p<0.001 level. This clearly indicates that the topical application of Amla juice on diabetic foot ulcer had shown a significant improvement in the post test degree of wound healing among clients with diabetic foot ulcer in the experimental group.

In comparison of post test degree of wound healing among clients with diabetic foot ulcer between the experimental and control group revealed that the calculated unpaired ‘t’ value t= 5.380 was found to be statistically significant at p<0.001which indicates that there was difference in the post test degree of wound healing between the groups, this clearly shows that topical application of diabetic foot ulcer had improvement the degree of wound healing in the experimental group.

The data was collected and analyzed by using the descriptive and inferential statistics. The findings revealed that there was high significant difference in the degree of wound healing among clients with Diabetic foot ulcer after Topical application of Amla juice.

The analysis also revealed that there was statistical significant association degree of wound healing on diabetic foot ulcer clients with demographic variables like habit of smoking and family history of diabetes mellitus in experimental group at p<0.05 and there is no statistical significance association with other demographic variables in experimental group.

CONCLUSION

The present study assessed the effectiveness of topical application of Amla juice on wound healing among client with diabetic foot ulcer admitted at selected hospital in Tiruvannamalai. The study findings revealed that there is a significant improvement in the degree of wound healing among the client with diabetic foot ulcer after applying Amla juice.

Therefore topical application of Amla juice is necessary to be provided as an alternative treatment used as a part of nursing intervention in the care of diabetic foot ulcer as the diabetic foot ulcer clients are at high risk of getting complications like amputation. Amla juice dressing would enhance and speedup the wound healing process.

Therefore Amla juice dressing would act as an excellent alternative therapy in imparting quality nursing care.

NURSING IMPLICATIONS

The investigator has drawn the following implications from the study which is of vital concern to the field of Nursing practice, nursing education, nursing administration and research.

Nursing Practice

- The nursing person should develop knowledge about the Diabetic foot ulcer
- Staff development program should be planned for imparting education and training regarding alternative therapy like Amla juice application to speedup the wound healing process in the clients with Diabetic foot ulcer.
- Nurse working in the clinical setting and community setting should conduct heath education program for the utilization of alternative therapy in the management of diabetic foot ulcer like Amla juice application for Diabetic wound healing among clients with Diabetic foot ulcer.
- Plan to create an awareness regarding Amla juice topical application for wound healing in Diabetic foot ulcer.

Nursing Education

- Nurse educators need to be equipped with adequate knowledge regarding alternative therapies.
- Nursing curriculum needs to be strengthened to assess the alternative therapy like Amla juice application as a part of nursing intervention to promote wound healing in clients with Diabetic foot ulcer.
- The significant complimentary alternative medicines that is considered to be beneficial for chronic disease like diabetic mellitus, hypertension, heart disease ,has to be taught as a part curriculum of increase to knowledge attitude and practice among the student and staff nurses.
- The need for specialization in Diabetic foot ulcer has to be enhanced with special focus for use of alternative therapy like Amla juice on wound care among clients with Diabetic foot ulcer

- ❖ Student should be encouraged and motivated to practice the utilization of alternative therapy like amla juice application, when planning and implementing care for clients with Diabetic foot ulcer.
- ❖ conduct workshops for the student for use of the alternative therapy in clients with chronic illness, strengthened the curriculum for nurses to excel in the knowledge and skill in utilization of Amla juice application in nursing care of clients with Diabetic foot ulcer.

Nursing Administration

- ❖ In –service education, conferences, workshop can be organized on various aspects of diabetic foot ulcer and its management emphasizing use of alternative therapies
- ❖ The Nurse administrator should frame a system of care given by Nurse to client with diabetic foot ulcer along with adequate allocation of funds for continuous education programme for the use of alternative management in care of client with diabetic foot ulcer.
- ❖ Collaborate with the governing bodies as well as the hospital administration to formulate standard protocols and policy guidelines to emphasize alternative therapies in the nursing care of client with diabetic foot ulcer.
- ❖ Nurse administer should take initiative to spread information of regular Amla juice application on wound healing in diabetic foot ulcer clients either by individual or group teaching in the clinical and community setting.

Nursing Research

- ❖ Nurse researcher can encourage clinical nurse to apply the research findings in their daily nursing care activities and utilize this simple cost effective technique among clients with diabetic foot ulcer.
- ❖ The nurse researcher can promote more research with regard to utilization of various complementary and alternative therapies in clients with diabetic foot ulcer.
- ❖ Dissemination of findings through conferences, professional journals will make the application of research findings more effective.

RECOMMENDATIONS

1. The study can be conducted in large population in different setting for better generalization.
2. The study can be conducted to assess the effectiveness of Alternative therapy, other than Amla juice on wound healing in clients with diabetic foot ulcer.
3. A study to assess the effectiveness of structured teaching regarding alternative therapy for the management of diabetic foot ulcer
4. A comparative study to assess the effectiveness of Amla juice Vs other alternative therapy on wound healing in clients with diabetic foot ulcer
5. Comparative study on alternative therapy for client with diabetic foot ulcer can be done between urban and rural population.

LIMITATIONS

1. The investigator faced difficulty in collecting the review of literature, as there only limited nursing studies on use of Amla juice dressing application on client with diabetic foot ulcer.
2. The study could have been conducted in large subjects for better generalization.

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Affiliated to The Tamil Nadu Dr.M.G.R. Medical University, Chennai

LETTER SEEKING AND GRANTING PERMISSION FOR DATA COLLECTION

Date: 05.05.2014

To

The chief medical officer,
T.N.K. Hospital, Thiruvoodal street,
Tiruvannamalai.

Sir,

Sub: Requesting to grant permission for data collection– regarding

******

Mrs R.Suguna is a bonafide student of our college studying in M.Sc (Nursing) programme. As a partial fulfillment of the University requirement for the award of M.Sc (Nursing) degree, she needs to conduct research project.

Her chosen research project is as follows "A study to assess the effectiveness of topical application of Amla juice on wound healing among client with diabetic foot ulcer admitted in selected hospital Tiruvannamalai" during May-June 2014 .

She will abide by the rules and regulations of the institution and adhere to the institutional policies during her period of data collection. Permission may kindly be granted to her for conduction of the study at your esteemed institution.

Further details of the proposal project will be furnished by the student personally. Confidentiality will be ensured in the research project.

Thanking you

Yours faithfully,

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J.D.Health Retd, Tiruvannamalai Dt.,

Authorized Medical Attendant, S.B.I.,

T.N.K.Hospital, No.259/49, Thiruvoodal Street,

Tiruvannamalai-606 601

To

The Principal,

Vignesh Nursing College,

Tiruvannamalai.

Madam,

Sub: permission for conducting study- Reg.

Ref: your letter dated 05.05.2014

With reference to your above letter, we are happy to permit Ms.R.Suguna.,M.Sc.(Nursing) 2nd year student to conduct her pilot study and followed by main study on "A study to assess the effectiveness of topical application of Amla juice on wound healing among client with diabetic foot ulcer admitted at selected hospital ,Tiruvannamalai." at our institution during May- June 2014 under the following conditions,

Terms and Conditions:

A) The candidate should strictly follow the rules and regulations of our hospital.
B) Whatever details collected should be presented to us for vetting before submission to the college.
C) Information so collected should be kept strictly confidential.

Thanking you

T.N.K.HOSPITAL ★ No.259/49 Thiruvoodal Street, ★ TIRUVANNAMALAI-606 601.

Dr.N.VIJAYAKUMAR, M.B.B.S., M.S., F.A.I.S.,
J.D. Health Retd.,
Authorised Medical Attendant, S.B.I.,
T.N.K. Hospital, Thiruvannamalai-606 601

APPENDIX – B

LETTER SEEKING EXPERTS OPINION FOR CONTENT VALIDITY

From

R.Suguna,
M.Sc.(Nursing) II Year,
Vignesh Nursing College,
Tiruvannamalai.

To

Respected sir/madam,

SUB: Requisition for expert opinion for content validity.

I am a second year M.Sc (Nursing) student studying in Vignesh Nursing College, Manalurpet Road, Tiruvannamalai, under the Tamilnadu Dr.M.G.R. Medical University.

I would like to conduct "A study to assess the effectiveness of Topical Application of Amla juice on wound healing among clients with diabetic foot ulcer admitted at selected hospital, Tiruvannamalai".

Herewith I am sending the developed tool for content validity for your opinion and possible suggestions, I would be most obliged if you can do the needful and return it to the undersigned.

Thanking you,

Yours faithfully,

R.SUGUNA

Enc:

1. Research proposal
2. Research Tool and Scoring Key
3. Certificate for content validity
4. Self –Addressed Envelop

APPENDIX – C

LIST OF EXPERTS FOR CONTENT VALIDITY

MEDICAL EXPERTS:

1 **Dr.K. Karthikeyan M.D (Gen. Med).,**
Assistant Professor,
Dept. of Medicine,
Govt.Thiruvannamalai Medical College and Hospital,
Tiruvannamalai - 606 604

2 **Dr. Vijayakumar, M.B.B.S., M.S., F.A.I.,**
Authorized medical attendant, S.B.I.,
T. N. K Hospital,
Tiruvannamalai – 606 601.

NURSING EXPERTS:

1 **Mrs. Priyadharshini M.Sc(N)**
Principal cum Professor in Nursing,
Al-Ameen College of Nursing,
Tiruvannamalai - 606 604.

2 **Mrs.N.Anitha, M.Sc.(N)**
Professor,
Sri Gokulam College of Nursing,
Neikkarapatti,
Salem- 636 010

3 **Mrs. Jolly Ranjith M.Sc(N)**
Professor,
Medical Surgical Nursing
Omayal Achi College of Nursing
Chennai – 600 066.

4 **Mrs.M.Sumathi,M.Sc(N), Ph.D(N)**
Professor, Head of the Department ,
Medical Surgical Nursing
Omayal Achi College of Nursing,
Chennai – 600 066.

5 **Mrs. S. Sasikala, M.Sc(N)**
Assistant Professor,
Medical Surgical Nursing
Omayal Achi College of Nursing,
Chennai – 600 066.

6 **Mr.P.Vasanthakumar, M.Sc(N)**
Assistant Professor,
Vinayaka Mission college of Nursing,
Karikal - 609 602.

DIETICIAN EXPERT:

1 **Dr.(Mrs).P.V.Lakshmi**
Dietician,
Global Health City,
Chennai.

CERTIFICATE OF ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work **"A study to assess the effectiveness of topical application of Amla juice on wound healing among client with diabetic foot ulcer admitted in selected hospital in Tiruvannamalai,"** done by Mrs. R. Suguna II year,M.Sc. (Nursing) student of Vignesh Nursing College,Tiruvannamalai, is edited for English language appropriateness.

Seal with Date:

Signature:

P.RAJIVGANDHI,M.A.,B.Ed.,
P.G. Asst. in English,
G.H.S.S., Palayanur,
Tiruvannamalai District.

CERTIFICATE OF TAMIL EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work '' **A study to assess the effectiveness of topical application of Amla juice on wound healing among client with diabetic foot ulcer admitted in selected hospital in Tiruvannamalai,''** done by Mrs. R. Suguna II year,M.Sc. (Nursing) student of Vignesh Nursing College,Tiruvannamalai, is edited for Tamil language appropriateness.

Seal with Date:

லோ.திருமலை, M.A., B.Ed.,
பட்டதாரி ஆசிரியர் (தமிழ்)
அரசினர் மேல்நிலைப்பள்ளி,
தச்சம்பட்டு, தி.மலை-606 811.

Signature:

லோ.திருமலை. M.A., B.Ed.,
பட்டதாரி ஆசிரியர் (தமிழ்)
அரசினர் மேல்நிலைப்பள்ளி,
தச்சம்பட்டு, தி.மலை-606 811.

APPENDIX – F

INFORMED CONSENT

Greetings,

I **Mrs.R.Suguna**, M.sc.(Nursing) II year,Vignesh Nursing College, Tiruvannamalai, has been conducting **"A study to assess the effectiveness of topical application of Amla juice on Wound healing among Clients with Diabetic foot ulcer admitted at selected Hospital, Tiruvannamalai"** for the partial fulfilment of the requirement for the degree of M.Sc., Nursing under Tamil Nadu Dr. M.G.R. Medical University, Chennai.

As a part of research work, I need to collect a data from clients with diabetic foot ulcer. In connection with the same, I seek your valuable support and kind cooperation to complete the frill work related to my research work in time. Further I assure you sir/madam; the information provided by you will be kept confidential and will not be disclosed at any stage. Your precious support is solicited.

Thank you.

ஒப்புதல் படிவம்

வணக்கம்,

ரா.சுகுனா ஆகிய நான் புழலில் உள்ள விக்னேஷ் செவிலியர் கல்லூரியில் முதுகலை பட்டப்படிப்பு பயின்று வருகின்றேன். என் படிப்பின் ஒரு பகுதியாக நீரிழிவு நோயாளிகளுக்கு ஏற்படும் கால் புண்ணை நெல்லிக்காய் சாறு கொண்டு குணப்படுத்துவது பற்றிய ஆய்வை நடத்துவதற்கான கேள்விகளை வடிவமைத்துள்ளேன்.

தயவு செய்து நீங்கள் என்னுடன் ஒத்துழைக்குமாறு வேண்டிக் கொள்கிறேன். நான் உங்களிடம் இருந்து பெற்ற தகவல்களை எக்காரணத்தைக் கொண்டும் வெளியிட மாட்டேன் என்று உறுதி அளிக்கிறேன்.

நன்றி!

APPENDIX – G

INFORMED CONSENT REQUISITION FORM

I understand that I am being asked to participate in a research study conducted by **Mrs.R.Suguna,** M.sc (N) student of Vignesh Nursing College, Tiruvannamalai. This research study will assess the **"A study to assess the effectiveness of topical application of Amla juice on Wound healing among Clients with Diabetic foot ulcer admitted at selected Hospital, Tiruvannamalai".** If I agree to participate in the study, I will be interviewed. The interview may be recorded and will take place in privacy. No identifying information will be included when the interview is transcribed. I understand that there are no risks associated with this study.

I realize that the benefits of the Amla juice and from this study may help either me or other people in the future. I realize that my participation in this study is entirely voluntary, and I may withdraw from the study at any time I wish. If I decide to discontinue my participation in this study, I will continue to be treated in the usual and customary fashion.

I understand that all study data will be kept confidential. However, this information may be used in nursing publication or presentations. If I need to, I can contact **Mrs.R.Suguna,** M.Sc. (N) II year student of Vignesh Nursing College, Tiruvannamalai at any time during the study.

The study has been explained to me. I have read and understood this consent form, all of my questions have been answered, and I agree to participate. I understand that I will be given a copy of this signed consent form.

---------- ----------

Signature of Participant Date:

---------- ----------

Signature of Investigator Date:

முன் அறிவிப்பு ஒப்பந்த படிவம்

விக்னேஷ் செவிலியர் கல்லூரியின் சார்பில் முதுநிலை பட்டப்படிப்பு பயிலும் ரா.சுகுனா அவர்களால் நடத்தபெறும் இந்த ஆய்வில் என்னை பங்கேற்க கேட்டுக் கொண்டதை நான் ஏற்றுக்கொள்கிறேன். இந்த ஆய்வுக்கு நான் ஒப்புக் கொண்டால் அதனைத் தொடர்ந்து உள்ள பயிற்சிகளில் நான் பங்கேற்க வேண்டும் என்றும் என்னிடம் நடத்தும் இந்த ஆய்வு முடிவுகள் அனைத்தும் பதிவு செய்து பாதுகாக்கப்படும் என்பதை நான் அறிவேன். நான் எவரின்/யாருடைய காட்டாயத்தின் பெயரிலோ அல்லது வற்புறுத்தலின் பெயரிலோ ஆய்வில் பங்கு கொள்ளவில்லை என்பதையும் தேவைப்பட்டால் நான் ஆய்விலிருந்து விலகிக் கொள்ளும்பட்சத்திலும் எப்போதும் பிறரைப் போலவே நடத்தப்படுவேன் என்பதை அறிவேன்.

என்னைப் பற்றிய அனைத்து தகவல்களும் இரகசியமாக பாதுகாக்கப்படும் என்பதையும் தேவைப்படும் போது ஆய்வின் முடிவுகள் செவிலியர் சார்ந்த பத்திரிகைகைகளிலும், கருத்தரங்குகளிலும் வெளியிட முழு சம்மதம் அளிக்கிறேன். இந்த ஆய்வினை பற்றிய முழு விளக்கமும் எனக்கு அளிக்கப்பட்டிருக்கிறது. அதனை நான் முற்றிலுமாக புரிந்து கொண்டு ஆய்வில் பங்குக்கொள்ள சம்மதம் அளிக்கிறேன்.

இந்த ஆய்வில் தேவைப்படும் போது எப்போது வேண்டுமானாலும் ரா.சுகுனா அவர்களை விக்னேஷ் செவிலியர் கல்லூரியில் தொடர்பு கொள்ளலாம் என்பதை அறிவேன்.

பங்குகொள்பவரின்/பாதுகாவலரின் கையொப்பம் **தேதி:**

ஆராய்ச்சியாளரின் கையொப்பம் **தேதி:**

APPENDIX – H

SECTION A: DEMOGRAPHIC VARIABLES

1.Age in years

a) 41-50 years

b) 51-60 years

c) 61-70 years

d) >70 years

2.Gender

a) Male

b) Female

3.Educational status

a) Nonliterate

b) Primary school

c) Higher secondary school

d) Graduate

4.Occupational status

a) Unemployed

b) Unskilled

c) Semiskilled

d) Skilled

e) Professional

f) Other

5.Monthly income (Rs/Month)

a) < 5000

b) 5001-10,000

c) 10001-15000

d) > 15000

6.Type of physical activity

a) Mild

b) Moderate

c) Heavy

d) Sedentary

7.Religion

a) Hindu

b) Christian

c) Muslim

d) Other

8.Type of family

a) Nuclear

b) Joint

c) Extended

9.Marital status

a) single

b) Married

c) Divorced

d) Widow or widower

10.Dietary pattern

a) Vegetarian

b) Non vegetarian

11.Exercise

a) Yes

b) No

12.Habit of smoking

a) Yes

b) No

13.Consumption of alcohol

a) Yes

b) No

14.Family history of diabetes mellitus

a) Yes

b) No

15. Type of diabetic

a) Type I

b) Type II

16.Duration of diabetic treatment

a) 1-2 years

b) 3-4 years

c) 5-6 years

d) Above 8 years

17.Nature of treatment

a) Oral hypoglycemic agents

b) Insulin

c) Diet control / exercise

d) All the above

18) site (or) area involved

a) Right lateral

b) Left lateral

c) Right sole

d) Left sole

e) Right heel

f) Left heel

19. Type of wound (or) stage

a) Non blanchable redness

b) Blister

c) Exposed subcutaneous

d) Exposed muscle and bone

20).Duration of diabetic foot ulcer

a) < 1 year

b) 1-2 years

c) 2-3 years

d) >3 years

21.Duration of dressing diabetic foot ulcer

a) < 3 months

b) 4-6 months

c) 7-9 months

d) above 9 months

தனி நபர் விவரம்

1. வயது வருடங்களில்
   அ) 41 – 50 வருடங்கள்
   ஆ) 51 – 60 வருடங்கள்
   இ) 61 – 70 வருடங்கள்
   ஈ) >70 வருடங்கள்

2. பாலினம்
   அ) ஆண் ஆ) பெண்

3. கல்வித்தகுதி
   அ) கல்வி அறிவில்லாதவர்
   ஆ) நடுநிலைக்கல்வி
   இ) உயர்நிலைக்கல்வி
   ஈ) பட்டப்படிப்பு

4. வேலைத்தகுதி
   அ) வேலையில்லாதவர்
   ஆ) பயிற்சியற்ற வேலை
   இ) ஓரளவு பயிற்சிபெற்ற வேலை
   ஈ) பயிற்சி பெற்ற வேலை
   உ) தொழிற்துறை
   ஊ) மற்றவை

5. மாதவருமானம்
   அ) <5000
   ஆ) 5000 – 10,000
   இ) 10001 – 15000
   ஈ) >15000

6. பணி விவரம்
   அ) லேசான வேலை
   ஆ) மிதமான வேலை
   இ) அதிக வேலை
   ஈ) உடல் உழைப்பு தேவைப்படாத வேலை

7. மதம்
   அ) இந்து
   ஆ) கிறிஸ்துவர்
   இ) முஸ்லீம்
   ஈ) மற்றவை

8. குடும்ப வகை
   அ) தனிக்குடும்பம்
   ஆ) கூட்டுக்குடும்பம்
   இ) நீட்டிக்கப்பட்ட குடும்பம்

9. திருமண தகுதி
   அ) திருமணமாகாதவர்
   ஆ) திருமணமானவர்
   இ) விவாகரத்து ஆனவர்
   ஈ) விதவை & மனைவியை இழந்தவர்

10. உணவு வகை
அ) சைவம் ஆ) அசைவம்

11. உடற்பயிற்சி
அ) இல்லை ஆ) ஆம்

12. புகைப்பழக்கம்
அ) இல்லை ஆ) ஆம்

13. மதுப்பழக்கம்
அ) இல்லை ஆ) ஆம்

14. குடும்பத்தில் நீரிழிவு நோயின் தாக்கம்
அ) ஆம் ஆ) இல்லை

15. நீரிழிவு நோயின் வகை
அ) வகை I ஆ) வகை II

16. நீரிழிவு சிகிச்சை காலம்
அ) இரண்டு வருடங்கள்
ஆ) 4 வருடங்கள்
இ) 6 வருடங்கள்
ஈ) 8 வருடங்களுக்கு மேல்

17. சிகிச்சையின் தன்மை
அ) வாய் வழியே இரத்த சர்க்கரை குறைக்கும் மருந்து
ஆ) இன்சுலின்
இ) உணவில் கட்டுப்பாடு பயிற்சி
ஈ) மேல் கூறிய அனைத்தும்

18. பாதிக்கப்பட்ட இடம் அல்லது பகுதி
அ) வலது பக்கவாட்டு
ஆ) இடது பக்கவாட்டு
இ) வலது பக்க உடல்
ஈ) இடது பக்க உடல்
உ) வலது பாதம்
ஊ) இடது பாதம்

19. காயத்தின் வகை அல்லது நிலை
அ) சிவத்தல் அல்லாத
ஆ) கொப்புளம்
இ) வெளிப்படும் தோலடி
ஈ) வெளிப்படும் தசை மற்றும் எலும்பு

20. நீரிழிவு நோய் கால் புண் காலம்
அ) <1 வருடம்
ஆ) 1 – 2 வருடங்கள்
இ) 2 – 3 வருடங்கள்
ஈ) >3 வருடங்கள்

21. நீரிழிவு நோய் கால் புண் காலம் மருந்திடும் காலம்
அ) <3 மாதங்கள்
ஆ) 4 – 6 மாதங்கள்
இ) 7 – 9 மாதங்கள்
ஈ) 9 மாதங்களுக்கு மேல்

MODIFIED BATES-JENSEN WOUND ASSESSMENT TOOL

S.NO.	ITEM	ASSESSMENT	DATA SCORE
1	SIZE	1 = Length x width <4 sq cm 2 = Length x width 4--<16 sq cm 3 = Length x width 16.1--<36 sq cm 4 = Length x width 36.1--<80 sq cm 5 = Length x width >80 sq cm	
2	DEPTH	1 = blanchable erythema on intact skin 2 = partial thickness skin loss involving epidermis &/or dermis 3 = Full thickness skin loss involving damage necrosis of subcutaneous tissue; may extend down to but not through underlying fascia; &/or mixed partial & full thickness &/or tissue layers obscured by granulation tissue 4 = obscured by necrosis 5 = Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone or supporting structures	
3	EDGES	1 = Indistinct, diffuse, none clearly visible 2 = Distinct, outline clearly visible, attached, even with wound base 3 = Well-defined, not attached to wound base 4 = Well-defined, not attached to base, rolled under, thickened 5 = Well-defined, fibrotic, scarred or hyperkeratotic	

4	UDER-MINING	1 = None present 2 =Undermining < 2 cm in any area 3 = Undermining 2-4 cm involving < 50% wound margins 4 = Undermining 2-4 cm involving > 50% wound margins 5 = Undermining > 4 cm or Tunneling in any area	
5	NECROTIC TISSUE TYPE	1 = None visible 2 = White/grey non-viable tissue &/or non-adherent yellow slough 3 = Loosely adherent yellow slough 4 = Adherent, soft, black eschar 5 = Firmly adherent, hard, black eschar	
6	NECROTIC TISSUE AMOUNT	1 = None visible 2 = < 25% of wound bed covered 3 = 25% to 50% of wound covered 4 = > 50% and < 75% of wound covered 5 = 75% to 100% of wound covered	
7	EXUDATE TYPE	1=None 2 = Bloody 3 = Serosanguineous: thin, watery, pale red/pink 4 = Serous: thin, watery, clear 5 = Purulent: thin or thick, opaque, tan/yellow, with or without odor	
8	EXUDATE AMOUNT	1 = None, dry wound 2 = Scant, wound moist but no observable exudate 3 = Small 4 = Moderate 5 = Large	

9	SKIN COLOR SUR-ROUNDING WOUND	1 = Pink or normal for ethnic group 2 = Bright red &/or blanches to touch 3 = White or grey pallor or hypopigmented 4 = Dark red or purple &/or non-blanchable 5 = Black or hyperpigmented	
10	PERIPHERAL TISSUE EDEMA	1 = No swelling or edema 2 = Non-pitting edema extends <4 cm around wound 3 = Non-pitting edema extends ≥4 cm around wound 4 = Pitting edema extends < 4 cm around wound 5 = Crepitus and/or pitting edema extends >4 cm around wound	
11	PERIPHERAL TISSUE INDURATION	1 = None present 2 = Induration, < 2 cm around wound 3 = Induration 2-4 cm extending < 50% around wound 4 = Induration 2-4 cm extending ≥ 50% around wound 5 = Induration > 4 cm in any area around wound	
12	GRANU-LATION TISSUE	1 = Skin intact or partial thickness wound = Bright, beefy red; 75% to 100% of wound filled &/or tissue overgrowth 3 = Bright, beefy red; < 75% & > 25% of wound filled 4 = Pink, &/or dull, dusky red &/or fills ≤ 25% of wound 5 = No granulation tissue present	

13	EPITHE- LIALIZA- TION	1 = 100% wound covered, surface intact 2 = 75% to <100% wound covered &/or epithelial tissue >0.5cm in to wound bed 3 = 50% to <75% wound covered &/or epithelial tissue extends to <0.5cm into wound bed 4 = 25% to < 50% wound covered 5 = < 25% wound covered	

SCORING TECHNIQUE:

There is 13 items in the scale, the total score is 65.The higher the total scores the more severe the wound status.

Tissue health	1-12
Wound regeneration	13-20
Mild wound regeneration	21-30
Moderate wound degeneration	31-40
Severe wound degeneration	41-65

APPENDIX – I

CODING FOR DEMORAPHY VARIABLES

Demographic Variables	Code No.
1.Age in years	
a) 41-50 years	1
b) 51-60 years	2
c) 61-70 years	3
d) >70 years	4
2.Gender	
a) Male	1
b) Female	2
3.Educational status	
a) Nonliterate	1
b) primary school	2
c) Higher secondary school	3
d) Graduate	4
4.Occupational status	
a) Unemployed	1
b) Unskilled	2
c) Semiskilled	3
d) Skilled	4
e) Professional	5
f) Other	6
5.Monthly income (Rs/Month)	
a) < 5000	1
b) 5001-10,000	2
c) 10001-15000	3
d) > 15000	4

6.Type of physical activity

a) Mild	1
b) Moderate	2
c) Heavy	3
d) Sedentary	4

7.Religion

a) Hindu	1
b) Christian	2
c) Muslim	3
d) Other	4

8.Type of family

d) Nuclear	1
e) Joint	2
f) Extended	3

9.Marital status

e) Single	1
f) Married	2
g) Divorced	3
h) Widow or widower	4

10.Dietary pattern

a) Vegetarian	1
b) Non vegetarian	2

11.Exercise

a) Yes	1
b) No	2

12.Habit of smoking

a) Yes	1
b) No	2

13.Consumption of alcohol

a) Yes	1
b) No	2

14.Family history of diabetes mellitus

a) Yes	1
b) No	2

15. Type of diabetic

a) Type I	1
b) Type II	2

16.Duration of diabetic treatment

a) 1-2 years	1
b) 3-4 years	2
c) 5-6 years	3
d) Above 8 years	4

17.Nature of treatment

a) Oral hypoglycemic agents	1
b) Insulin	2
c) Diet control / exercise	3
d) All the above	4

18) Site (or) area involved

g) Right lateral	1
h) Left lateral	2
i) Right sole	3
j) Left sole	4
k) Right heel	5
l) Left heel	6

19. Type of wound (or) stage

a) Non blanchable redness	1
b) Blister	2
c) Exposed subcutaneous	3
d) Exposed muscle and bone	4

20).Duration of diabetic foot ulcer

a) < 1 year	1
b) 1-2 years	2
c) 2-3 years	3
d) >3 years	4

21.Duration of dressing diabetic foot ulcer

a) < 3 months	1
b) 4-6 months	2
c) 7-9 months	3
d) above 9 months	4

APPENDIX – J

SCORING KEY:

There is 13 items in the scale; the total score is 65.The higher the total scores the more severe the wound status.

S.NO.	DEGREE OF WOUND HEALING	SCORING
1	Tissue health	1-12
2	Wound regeneration	13-20
3	Mild wound regeneration	21-30
4	Moderate wound degeneration	31-40
5	Severe wound degeneration	41-65

APPENDIX – K

Plagiarism Detector - Originality Report

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Plagiarism Detection Chart: